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ANNUAL REPORT

OF THE

BOARD OF HARBOR AND LAND COMMISSIONERS

FOR THE YEAR 1896.

BOSTON:
WRIGHT & POTTER PRINTING CO., STATE PRINTERS,
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Commonwealth of Massachusetts.

REPORT.

To the Honorable the Senate and House of Representatives of the Commonwealth of Massachusetts.

The Board of Harbor and Land Commissioners, pursuant to the provisions of law, respectfully submits its annual report for the year 1896, covering a period of twelve months, from Nov. 30, 1895.

Hearings.

The Board has held one hundred and sixty-six formal sessions during the year, at which one hundred and eighty-three hearings were given. One hundred and twenty-one petitions were received for licenses to build and maintain structures, and for privileges in tide waters, great ponds and the Connecticut River; of these, one hundred and fifteen were granted, four withdrawn and two denied.

On June 5, 1896, a hearing was given at Buzzards Bay on the petition of the town of Wareham that the boundary line on tide water between the towns of Wareham and Bourne at the highway bridge across Cohasset Narrows, as defined by the Board under chapter 196 of the Acts of 1881, be marked on said bridge.

On June 20, 1896, a hearing was given in Nantucket on the petition of the local board of health for license to fill a dock.

On June 23, 1896, a hearing was given in Vineyard Haven on the matter of boundary line between the towns of Gay Head and Chilmark, pursuant to chapter 187 of the Acts of 1896.

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On July 11, 1896, a hearing was given in Provincetown in regard to the occupation of the Province Lands.

All other hearings were given by the Board in Boston.

Many important matters pending before various committees of the Legislature during the last session have required the attendance of the Board, and demanded careful study and consideration of the interests of the Commonwealth.

South Boston Flats.

The work of filling and improving the tide-water lands known as the Commonwealth's flats at South Boston has been confined to a general care of the property and a supervision of the deposits, also to the cremation of the rubbish and other material brought in carts for which a free dump is desired. The solid part of this material has been used in surfacing a portion of the area which was filled by hydraulic dredging, and also in filling some holes along the bulkheads protecting the northerly and easterly sides of the seventy-acre lot where the filling had been washed out by the sea during heavy storms.

The property generally, including the sewers, is in excellent condition. The streets, however, other than Congress Street between B and C streets, although filled to grade, have not been paved or otherwise surfaced to prepare them for teaming.

The development of the lands has been retarded by the uncertainty existing as to the future of Congress Street, about which the New England Railroad Company, the city of Boston and the Commonwealth had been unable to reach an agreement. A special grade crossing act passed last winter, being chapter 535, Acts of 1896, authorized a commission to hear the parties interested and determine what should be done in the matter. That commission has been sitting and has proceeded so far as to determine that the portion of Congress Street crossing the land of the railroad company shall be discontinued, and that a new street starting at the intersection of the extension of Summer Street with the harbor line on the westerly side of Fort Point Channel shall cross Fort Point Channel and the intervening land at an elevation and join Congress Street at about its junction with C Street,

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there making a slight angle. The width of the new street will be 100 feet and its highest elevation will be 24.5 feet in crossing the railroad tracks, from which it will descend at grades of from 1.5 per cent. to 1.75 per cent. to the level of existing streets.

It has also been determined to broaden Congress Street from L Street bridge to a point just east of C Street to a width of 100 feet; also to build a side approach to Congress Street 80 feet wide along the harbor line on the Boston side of Fort Point Channel; and to widen Congress Street to 80 feet from the harbor line to Atlantic Avenue. On the South Boston side a lateral approach is to start near the harbor line and to follow substantially the location of the tracks of the New England Railroad to A Street. After passing on to the Commonwealth's property another lateral approach is to start at D Street and follow D Street to Fargo Street, thence to C Street. A bridge is to span B Street 60 feet wide, with 19 feet headroom, and another at C Street 80 feet wide, with a minimum headroom of 16½ feet. This elevated street it is feared may occasion damage to all of the Commonwealth's land, but more particularly that portion in its immediate vicinity, because this street is the only one affording direct communication with the business heart of the city, and provision for approaching it at two points only has been laid out by the Commissioners, — one on Congress Street about 268 feet east of E Street, the other at the corner of C and Fargo Streets. This last street is only 50 feet wide and is the only outlet over the new street provided for the 100 acres of the Commonwealth's property south of Congress Street and north of West First Street.

The other streets now connecting with Congress Street, viz., B, D and E Streets, will be left at the points of intersection from 6 to 24 feet below the grade of the new street, and will have to be filled by the Commonwealth to make graded approaches. The result of this will be to create a high causeway across the middle of the lands to which the side streets will have to be graded at more or less expense. Doubtless the work of construction will proceed as rapidly as possible on this new street, but until it and its approaches and the new bridge across Fort Point Channel to connect it

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with Summer Street shall be nearly completed, the land will fail to present the desired attractiveness for building purposes for which it is so well adapted. The same commission is also charged with the duty of determining in what proportions the cost of this grade crossing shall be borne by the respective parties. The Commonwealth's interests have been most carefully guarded throughout the hearings by the Attorney-General's department, to which this Board has given every and all assistance and information within its power.

Another fact affecting these lands of the Commonwealth was the passage of the Southern Union Station Act, being chapter 516, Acts of 1896, whereby ten wharves, covering one-half mile of water front on Fort Point Channel, have been forever barred to maritime purposes. The operation of the two statutes prohibits the contemplated extension of Mt. Washington Avenue as a thoroughfare through the hundred-acre parcel between Congress and West First streets, and will compel all traffic from this district to seek an outlet through one or the other of the aforenamed streets.

It is fair to presume that the conditions are now fixed under which the filled lands at South Boston may be developed without further interference from the railroads. There are about 177 acres of these lands, of which about 70 will lie north of the new elevated street. Of this a strip of say perhaps 150 feet in depth, fronting southerly on the new street, may be sold for warehouses or mercantile purposes, in the rear of which lies a large tract of many acres bounded on the north by the harbor and on the west by the railroad property. This tract is particularly well located with its large water front for maritime purposes and is already attracting attention. No land is better located for improvement for wharf and dock purposes than that lying adjacent to the railroad premises.

Now that the action of the New York, New Haven & Hartford Railroad Company has cut off all approaches along the western side of this great property of the Commonwealth for seven-eighths of a mile between First Street and the proposed Northern Avenue to one street, and that one elevated over the railroad to a height of 24.5 feet above the general

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level, it becomes imperative to proceed with the construction of Northern Avenue across the railroad property and with the building of Oliver Street bridge. Otherwise the seventy acres north of Congress Street will be practically bottled up, and it would be idle to contemplate development by improving the wharf frontage with no outlet at grade for the heavy traffic incident to commercial trucking, and no opportunity of reaching the warehouses and wholesale marts of the city without travelling three sides of a square and elevating a load 24.5 feet in the air, instead of a short straight line at grade.

The time has come which must decide whether the wharf frontage of the Commonwealth's property is to be made valuable to the public or be neglected for lack of due and proper approaches.

The Board recommends that provision be made for laying out and building Northern Avenue across the property of the New England Railroad Company and for the construction of a bridge in continuation thereof across Fort Point Channel to the city proper, thereby connecting the proposed docks and piers on the Commonwealth's property with the business portion of the city by a practically level street.

The plan appended shows the proposed bridge and Northern Avenue, so laid out as to connect at grade with the projected docks and wharves. It shows the avenue on the Commonwealth's lands at a width of 150 feet, as being the proper width in the light of modern requirements for an avenue at the head of wharves of the proposed class. The proposed Northern Avenue will necessarily be at grade with the railroad tracks. Its purposes are to supply additional conveniences for delivering and shipping merchandise at the proposed docks and wharves by both rail-haul and truckage, and to afford more direct and shorter communication at grade with the business centres of the city and with connecting railroads. Its uses would naturally be confined to heavy teaming and railroad transportation such as is connected with loading and discharging steamships. It can never be expected or desired that it will be a pleasure drive, and its establishment at grade should be secured beyond fear of change and the expense incident thereto.

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In October last an agreement was made with L. G. Burnham & Co. for the occupation of about 6½ acres of the filled land on the northerly side of Congress Street near the L Street bridge, extending from Congress Street to within 50 feet of the bulkhead on the northerly side of the filled flats. The agreement provides for a lease for the term of fifteen years, to be executed as soon as legislation is passed clearly defining the powers of the Board in the matter. The rental agreed upon will give the Commonwealth a fair return for the money expended in reclaiming the land and in making the proposed improvement, and is so graduated that upon the termination of the lease the rate then being paid will be a fair return upon the anticipated enhanced value of the property. The Commonwealth agrees to build an oak pile wharf 400 feet long, and to dredge a channel 75 feet wide and 18 feet deep at mean low water from alongside the wharf to the main channel of the harbor. Mr. Burnham proposes to erect on the premises the buildings, elevators, plant and machinery necessary for carrying on a large coal business, and is to make all repairs and do all additional dredging required by him during the term of the lease. A contract * has been made with the New England Dredging Company, dated Oct. 22, 1896, for dredging the channel, for the sum of $13,945; and a contract † with Albert A. Hersey, dated Oct. 19, 1896, for building the wharf, for the sum of $7,438, and work is progressing under both contracts. The property to be leased is that portion of the filled flats which is most remote from Fort Point Channel, but is at grade with the new Congress or Summer Street. A number of sales have recently been made on the south side of the Reserved Channel, and it is expected that the movement may extend to these Commonwealth's lands in the near future.

The balance in the Commonwealth's flats improvement fund on the first day of December, 1895, was $27,450.06. To this has been added during the year $574.45 from the income of the fund, $2,988.90 from rents of land, and $50,000 paid into the fund from the treasury of the Commonwealth under the provisions of chapters 442 and 548 of the Acts of

* See Appendix A. † See Appendix B.

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1896, making a total of $81,013.41. Of this sum there has been expended during the year $5,637.84, leaving an available balance on Nov. 30, 1896, of $75,375.57. An estimate of $400,000 to be paid into the Commonwealth's flats improvement fund was submitted through the Auditor's department with the estimates for other purposes. It is proposed to use this amount in the construction of a pier and dock on the northerly front of the Commonwealth's property.

The Board recommends that section 3 of chapter 19 of the Public Statutes, relating to leasing portions of the Commonwealth's property at South Boston, be amended so as to more clearly define the powers of the Board in relation thereto.

Surveys, etc.

The work on the Commonwealth's flats at South Boston has occupied much less of the time of the engineering force of the Board than for a number of years past, and has enabled the Board to carry on more general work than usual.

The triangulation for a resurvey of Mystic River from Chelsea bridge to the Medford line, which was begun last year, was completed in December, 1895, and January, February and March, 1896, including the calculation of the geographical positions of the stations located. Twenty-eight stations were occupied and the positions of one hundred and nine stations were determined.

Four plane table sheets were prepared for field work, and in July, during a lull in other work, the territory covered by a part of one sheet was surveyed and plotted on a scale of $\frac{1}{1000}$ uniform with the other sheets of the harbor resurvey. This work will be continued as opportunity offers.

In March surveys were made to correct and bring up to date the wharf lines on the plane table sheet of Fort Point Channel between the New England Railroad bridge and Federal Street bridge, including the wharves to be taken in carrying out the proposed plans for a Southern Union Station.

In May and June surveys were made to correct and bring up to date the wharf lines on the plane table sheet of the portion of East Boston lying between the Atlantic Works and Meridian Street bridge, and also on the sheet covering

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the portion of South Bay between Roxbury Canal and the New England Railroad.

In April and May soundings were taken off the Grand Junction wharves at East Boston and opposite the Mystic wharves at Charlestown, on which to base the plans and estimates for letting the contracts for dredging the shoals there.

In November soundings were taken over a portion of the area opposite the Mystic wharves which had been dredged during the summer. The work of dredging at this place and also opposite the Grand Junction wharves at East Boston has been frequently inspected and lines and grades marked to govern the work, the marks being renewed whenever necessary, and all material sent to sea has been accompanied by an inspector to be sure that it was dumped at the proper place.

In September soundings were taken over a portion of the South Boston flats for the purpose of preparing plans and estimates for the channel to be dredged under the provisions of the agreement with Mr. L. G. Burnham, and plans and specifications were prepared for the work and for the construction of the oak pile wharf which was also provided for in the same agreement.

In June a survey was made of the shore line and structures in Cohasset Narrows from the New York, New Haven & Hartford Railroad bridge to Buttermilk Bay, for the purpose of locating and defining a portion of the boundary line between the towns of Bourne and Wareham.

In the same month a survey was made of Menamsha Inlet, a portion of the boundary line between the towns of Gay Head and Chilmark. Copies were obtained from the United States Coast and Geodetic Survey at Washington of the plans of its surveys of this territory in 1845–46 and 1888, and a copy was obtained of the plan made in 1855 by Jeremiah Pease, showing the line established by the Legislature by chapter 204 of the Acts of 1856. Copies of these plans were made on the same scale as our plan in order to compare them with each other, and from these a plan has been made showing the changes which have occurred between the dates of the various surveys.

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In July and August we began a topographical survey of the Connecticut River and its banks, under the appropriation made by chapter 77 of the Resolves of 1896. The location of the triangulation stations established in its town boundary survey along the river from Springfield to North Hatfield was obtained from the Massachusetts Topographical Survey Commission. From these twenty-six stations near the river bank were established by triangulation, covering the territory from a point just above the islands opposite Mt. Holyoke to North Hatfield, and based upon these stations the topography for about 5 miles in length of the river between portions of Northampton and Hatfield on one side and of Hadley on the other has been surveyed and plotted on a plane table sheet on a scale of $\frac{1}{5000}$. Some apparent great transformations are taking place in this section, owing to the caving banks, and would have included the bank in Hadley had it not been protected by the Commonwealth in 1888 and 1889.

In addition to the above, a number of partial surveys of wharves have been made as a basis for calculating the amount of tide water displaced in carrying out the work licensed by the Board.

The work of repairing, mounting old plans, and of arranging and indexing the plans in the office has been continued during the year, but has been hindered by lack of room for arranging the plans.

Harbors.

Boston harbor is the first in importance in the Commonwealth and the second only in the United States. Its welfare and its improvement to a point which will enable the commerce there carried on to be transacted in a convenient and economical manner are matters of the highest consequence not only to the city and the State but to the country at large. As a distributing and transfer station in the highway of commerce, it is important that it should enjoy all the facilities and conveniences for economical handling and forwarding.

To the attainment of these objects and to the enhancement of safety in navigating the water-ways of the harbor, the

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work of the Federal government is in entire accord with the purpose of the Commonwealth.

The work of the War Department in removing rocks and ledges from the main ship channel has progressed slowly during the past year. The location of the work is very exposed and it is necessary to tow the working plant into sheltered anchorage whenever the wind blows heavily, thus losing much valuable time. A considerable quantity of the rock removed has been used in protecting the shores of Gallop's Island and Long Island.

In pursuance of a long-established policy, the Legislature at its last session appropriated $150,000 to be used in excavating the bottom of the harbor off the wharves beyond the lines of excavation to be done by the Federal government, and thus insure to the modern steamship a sufficient depth of water in which to float without grounding between her dock and the main channel. Immediately proposals for dredging were invited and a contract * was made June 11, 1896, with the New England Dredging Company to dredge about 127,000 cubic yards from the shoal in front of the Grand Junction wharves at East Boston for the sum of $48,280. The completion of this contract this season will give 27 feet at mean low water from the main channel to the line within which the dock owners do their own dredging, along the entire East Boston frontage at present used for the accommodation of large ocean steamships.

Another contract † was made July 8, 1896, with the Eastern Dredging Company, for the sum of $89,225, to dredge within a year about 218,000 cubic yards between the main channel and Mystic Wharf at Charlestown, where a large grain elevator, with a capacity of 1,750,000 bushels, is situated. This work is nearly done and will provide a depth here of 27 feet at mean low water out to the main channel. A few years ago the depth of 23 feet at mean low water was deemed sufficient for the largest vessels, and it was all that was called for by government contracts. Now, however, a depth of 27 feet at mean low water is made necessary by the draught of modern vessels of the largest class, and even then there is none too much to spare under the keel.

* See Appendix C. † See Appendix D.

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In the River and Harbor Act passed by Congress June 3, 1896, provision has been made for improving the harbor at Boston and many other places in the Commonwealth. At Boston $70,000 is appropriated for its preservation, and for continuing the improvements, and authority is given to contract for the completion of the project of 1892 for widening the main ship channel to a minimum width of 1,000 feet and a minimum depth of 27 feet at mean low water, at an expenditure under the continuing contract system not to exceed the further sum of $1,145,000. Proposals for bids are already invited, and there is every reason to believe the work will be vigorously prosecuted in the spring and pursued to consummation.

Appropriations for improving the rivers and harbors elsewhere in the Commonwealth to the amount of $359,000 have been made as follows, viz.: —

Improving harbor at Lynn: continuing improvement, $20,000.

Improving harbor of refuge at Nantucket: continuing improvement, $20,000.

Improving harbor at Plymouth: completing improvement, $1,500.

Improving harbor at Provincetown: completing improvement, $1,500.

Improving harbor at Newburyport: continuing improvement, $16,000.

Improving harbor at Scituate: continuing improvement, $6,000.

Improving Stage Harbor at Chatham: completing improvement, $5,000.

Improving harbor at Hyannis: continuing improvement, $6,000, of which sum $2,500 shall be expended for dredging.

Improving harbor at Vineyard Haven: continuing improvement, $7,000.

Improving harbor of refuge at Sandy Bay, Cape Ann: continuing improvement, $150,000.

Improving harbor at Gloucester: continuing improvement, $34,000.

Improving Woods Holl Channel, $20,000.

Improving New Bedford Harbor: continuing improvement, $10,000.

Improving Powow River: continuing improvement, $12,000.

Improving Taunton River: continuing improvement, $5,000.

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Improving Weymouth River: continuing improvement, $15,000, of which $10,000 shall be used in the improvement of Weymouth Back River.

Improving Essex River: continuing improvement, $5,000.

Improving Mystic and Malden Rivers: continuing improvement, $10,000.

For the improvement of the channel of the Merrimac River, $5,000.

Improving Town River, $10,000.

Also preliminary examinations are ordered to be made in this State as follows, viz.: —

Salt Pond and Herring River, in Harwich.

The approaches to the Cape Cod ship canal.

Gurnet Rock and other rocks at mouth of Plymouth harbor.

Duxbury Beach, with view to protection of harbor.

Duxbury Harbor, with view to widening and deepening improvement.

In addition, surveys are ordered to be made and cost of improvement to be estimated: —

Merrimac River, from Lowell to New Hampshire State line.

Marblehead harbor, with a view to improving the harbor by building a sea wall to protect the isthmus connecting Marblehead Neck with the town of Marblehead.

Provincetown harbor, with a view of erecting a dike for the protection of that harbor.

Neponset River.

Channel in New Bedford harbor leading to the bridge between that city and Fairhaven, with a view to determining what amount of dredging would be necessary to make the change in the draw in said bridge from the west to the east side of Fish Island practicable and advantageous.

Lynn harbor, with a view to securing a channel 300 feet wide and 15 feet deep at low water.

Boston harbor, with a view to securing a channel 1,200 feet wide and 30 feet deep from the Navy Yard to the entrance of the present main ship channel, and from the main ship channel in Presidents Roads through Broad Sound Channel.

Mount Hope Bay and Fall River harbor.

Manchester harbor.

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Connecticut River, between Holyoke and the foot of the Enfield rapids.

Plymouth harbor.

Weymouth Back River, from Hingham bridge to Mann's Wharf.

The provision for surveying a channel from the Navy Yard 1,200 feet wide and 30 feet deep through the main ship channel and thence through Broad Sound Channel is the first fruit of the effort started over a year ago. The survey will doubtless be made and the Congress of 1898 will be asked to make the necessary appropriation to give the harbor of Boston an entrance adequate for the accommodation of her growing commerce, and without which the highest possibilities of the port cannot hope to be realized. Already, it is said, the Germans are building steamships of 20,000 gross tonnage with a length of 650 feet, — that is, 100 feet longer than the width of the passage at "the Narrows" between Lovell's and Gallop's islands. We have seen that the last Congress has enabled the War Department, by means of the continuing contract system, to arrange for completing the project of August, 1892, for a channel 1,000 feet wide and 27 feet deep. At the same session, however, such has been the stride in increased size of steamships, authority is given to survey for a channel 1,200 feet wide and 30 feet deep, to the Navy Yard. Hardly is this in print before the Board is informed by the Warren Line people that they are expecting to replace the steamships of their line now sailing from this port with others of the largest type, and that greater depth of water will be needed over Man-of-War shoal to take the new vessels to the Hoosac Tunnel docks with safety. It is therefore recommended that the Federal government be asked to carry the project of a channel 30 feet deep not only to the Navy Yard, as proposed, but beyond to Charlestown bridge and to the junction of Chelsea Creek with Mystic River, to the end that all the railroad terminals may have a clear water-way of sufficient depth to float the largest steamships from the wharves to the sea.

Another object lesson on the inadequacy of the present ship channel was given by the grounding of the steamship "Roman" of the Warren Line on George's Island, Oct. 2, 1896, on her way to sea with a full cargo, while endeavor-

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ing to avoid a drifting scow supposed to have dynamite on board. She grounded hard and a considerable portion of her cargo had to be removed before she floated. In this connection, attention is again called to the danger of permitting long tows within the harbor limits whereby liability to damage to steamships by grounding in an effort to avoid them or to the barge in tow or the person of some one on board, is needlessly incurred. It is recommended that some legislation be passed, putting the regulation of this matter in charge of some competent agency.

Since making the last report, the committee on Rivers and Harbors of Congress, as guests of the city of Boston, visited the harbor and the Navy Yard at Charlestown. They enjoyed the hospitality of the Leyland Line on board the steamship "Cestrian" on her way down the harbor on her first voyage to Liverpool in March last. From her lofty deck they had a bird's-eye view of the passages, channels and narrows, and at sight were convinced of the importance and value of the proposed Broad Sound Channel, of which evidence was given by the ensuing legislation wherein the appropriation was made for a survey. They also visited the Navy Yard and were impressed with the facility with which a new large dry dock might be built in the immediate vicinity of the present one at a comparatively small cost for the class of structure desired.

The opening by Federal authority of Richford, Vt., last summer as a place for examination and passage of Canadian cattle was immediately felt in the demand for their transportation through Boston to Liverpool. This demand, though checked for a while by the action of the government, has been growing steadily since 1877, when the number of cattle exported was only 1,566, up to the past year of 1896, in which there were shipped from the port of Boston 161,008 cattle and 124,185 sheep. These figures show 36,887 cattle and 34,230 sheep more than were exported through New York in the same time, thus ranking this port as the first in the country on cattle shipments. This rank can be maintained if wharf accommodations and depth of water-ways are provided by the fostering care of the Federal government and the Commonwealth, supple-

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mented by the business sagacity and enterprise of the merchants.

Owing to the short crops abroad and to the abundance at home, shipments of grain have been larger the past year than ever before, and it may safely be said that while improvements for the purpose of diminishing the cost of handling grain have been put into practice elsewhere in this country, no port is better fitted to-day to cheaply handle and ship grain than is the port of Boston.

Experience has demonstrated that large vessels can be more economically used in the carriage of merchandise than small or moderate sized ones. Hence the advent of the great steamers "Victorian," "Sylvania," and "Canada," now running between Boston and Liverpool. Owing to the greater draught of this new class of steamships, measuring as they do 15,000 registered tons and drawing from 27 to 30 feet of water, as we have before said, deeper water-ways are required.

The commerce of the port is steadily increasing and, including foreign and coastwise, reached the large figures of 8,000,000 tons for the year ending June 30, 1896. Its value is also growing at a rapid rate, the exports alone having risen from $33,886,495 in 1875, to $100,000,000 during the year ending Sept. 30, 1896. This increase in value denotes a constantly expanding export in manufactured goods both in volume and variety. It will surprise many to learn that Boston is the third meat-packing city in the country, coming next to Kansas City in the quantity and value of the meats packed here for export. A perusal of the annually published list of exports by the Warren Line steamships would reveal an unknown market to many whose lines of business do not familiarize them with the character and extent of the manufactured articles which are sent abroad.

South Bay.

This bay lies at the head of Fort Point Channel and has been growing in importance commercially for several years past. Time was when the idea of filling it was entertained. Since then, however, its value as an inland basin, giving opportunity for the conveyance by water of the coarser com-

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modities and bulkier merchandise nearer to the place of consumption, has become recognized. Gradually and in response to slow-growing demand it is found to be convenient and serviceable as well as economical, and its preservation as an open water-way is no longer questionable.

The destruction of ten wharves and the subversion of one-half mile of water frontage on Fort Point Channel by the location of the Southern Union Passenger Station has driven off lumber, coal and other merchants from the premises taken for railroad purposes and compelled them to look elsewhere for a place for doing business. This has led to fresh interest in the possible accommodations of South Bay and a renewed application by the Roxbury Central Wharf Company for a license to improve its property by dredging and filling and building additional wharves.

It is in the interest of the public that every proper encouragement should be given to parties endeavoring to improve the inland water-ways and basins for the uses and purposes of commerce, and by so doing incite a healthy competition with other means of transportation. Incidentally also if trucking and teaming through the thoroughfares of the city is saved, by just so much is crowding and congestion diminished.

Green Harbor.

July 15, 1896, the joint board, consisting of the Harbor and Land Commissioners and the State Board of Health, organized under chapter 495, Acts of 1896, with Dr. Henry P. Walcott as chairman, for the purpose of taking action relative to the restoration of Green Harbor in the town of Marshfield, and appointed as its engineers to conduct the required examination, Frank W. Hodgdon, engineer of the Board of Harbor and Land Commissioners, and Xanthus H. Goodnough, engineer of the State Board of Health.

An inspection of the locality was made by the joint board on July 21 and 22, in which an examination was made of the mouth of the river and of the basin that would be flowed by the removal of the dike.

Until the report of the engineers has been received and acted upon there is nothing further to be reported relative to this subject.

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Great Ponds.

By chapter 318 of the Acts of 1888 this Board was given jurisdiction over great ponds containing in their natural state more than ten acres, and empowered to grant licenses for structures and other work, and to prevent by injunction or otherwise any unauthorized encroachments.

Since the passage of this act numerous applications for rights and privileges have been received, some of which have been granted subject to restrictions, and others denied. It is suggested that an appropriation be made for obtaining reliable data, by surveys and otherwise, in respect to the location, areas, and other matters connected with the great ponds belonging to the State, for the benefit of the Commonwealth and for the purpose of aiding this Board in its work.

Boundary Line between Gay Head and Chilmark.

Chapter 187 of the Acts of 1896 empowered the Board of Harbor and Land Commissioners to examine, define and determine the boundary line between the towns of Gay Head and Chilmark.

Under chapter 15 of the Resolves of 1855, commissioners were appointed "to establish the boundary line between the lands of said Indians (Gay Head) and the lands of the white inhabitants of Chilmark, in Dukes County." These commissioners reported to the Legislature in February, 1856 (House Doc. 48, 1856), in part, as follows: "Thence, north fifty and one-quarter degrees east, crossing said Menamsha Pond, in the direction of a rock upon Pease's Point, so called, distant about four hundred and fifty rods, until it strikes the middle of the channel, or outlet, from said pond to the Sound; then, by the middle of the said channel, or outlet, as the same now is, or hereafter may be, — the said channel being somewhat subject to change, — unto the Vineyard Sound."

A map showing the boundary line as run and established, drawn by Jeremiah Pease, surveyor, was filed with this report.

By chapter 204 of the Acts of 1856, the boundary line as

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laid down and described in the above report was established and confirmed.

By chapter 213 of the Acts of 1870, the district of Gay Head was abolished and the town of Gay Head incorporated.

By chapter 10 of the Resolves of 1875, the subject of the improvement of Menamsha Creek and Pond was referred to the Board of Harbor Commissioners for examination and report to the next Legislature.

In the report for 1875 the Board says: "According to the early history of this creek, its outlet was farther eastward than it has been since, and near where the beach joins the upland. About 1770 it either broke, or was dug 'square out' in the alignment of the main trend of the creek. This new channel, or outlet, gradually worked to the westward, ran crookedly through the beach, grew more shallow, and in the year 1842 closed up. In April, 1843, by volunteer labor, a new inlet was again dug through the beach 'square out' as the report says. This cut remained as a good channel, having five feet of water in it, until the great gale of June, 1853. The action of this gale so injured the creek, that it has been gradually deteriorating since. The creek is now narrow and crooked in its pathway through the beach, the entrance is from one-fourth to one-third of a mile westward from the site of the original cut, and has but about one-half a foot of water in it at low tide. . . . The most favorable and suitable location for the proposed cut through the beach is not in a line at right angles with the trend of the outer beach, but one beginning on the inside at the bend of the creek and inclining slightly westward, so that the channel and current through it shall partially coincide with the natural outside currents and influences which tend in this direction."

May 1, 1883, the Harbor and Land Commissioners, pursuant to chapter 196 of the Acts of 1881, located and defined the boundary line on tide water between these towns as follows: "Beginning at the end of the boundary line between said towns as heretofore established, at the mouth of Menamsha Creek, and running north 29° west, . . . to the general division line of tide water in Vineyard Sound."

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The portion of the boundary line in dispute being in the outlet of Menamsha Pond, the Board caused a topographical survey of this locality to be made and plotted. Upon it are shown the surveys made by the United States Coast and Geodetic Survey in 1845–46 and 1888.

An inspection of the premises was made by the Board on June 22, 1896, in company with the selectmen of both towns and their counsel, and a public hearing given in Vineyard Haven on the following day. Eight witnesses testified for Chilmark and four for Gay Head. The Board heard arguments of counsel in Boston, July 1, 1896.

The evidence tended to show that during the past sixty years the channel or outlet of Menamsha Pond has been travelling up and down the beach separating the pond from Vineyard Sound, having openings in different spots at different times, but all within a range of about 3,000 feet. Some of these openings were the operations of nature and some were caused by artificial means. For convenience, points of reference were located on the ground and marked on the plan by letters of the alphabet from a to g.

Witnesses testified that in 1836 the outlet was in the same place as at present; that in 1847 it was about at a; in 1855 about at b; in 1856 at b, c and d; in 1861 about at b; in 1862 about at b and a little west of b; in 1863 at b; in 1870 about at a and between a and b; in 1885 at a, and in 1891 between c and d; that in 1862 the old outlet was stopped up; in 1878–79 a bulkhead was built across the outlet and caused the same to turn toward the east; in 1885 the outlet was closed and an artificial one made; in 1895 it was dug through where the Board found it. It was obviously impossible to determine where the outlet would have been, had nature been allowed to have her course. It appeared that no controversy had arisen on account of the shifting nature of the boundary until the dispute about the right to locate fish pounds or weirs in 1892.

The Board is satisfied that a fixed boundary line will tend toward peace and quiet between both towns, and therefore has established a line on the old courses down to a point conveniently located for a straight and easily found course to the Sound, upon which the channel at some time

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probably flowed, and could with no great difficulty and at no great cost be dug again if either town desired, and recommends that either town may so dig if it chooses, in which case the other town shall have no right to divert the channel from the course, to the end that the outlet of Menamsha Pond may be maintained upon the boundary line by either or both towns, if it or they so choose, forever.

The boundary line which the Board has defined and determined is as follows: —

Beginning at a rock on a neck of land known as Nicodemus' Neck, near the westward part of Squibnocket Pond, — the rock near Smelt Creek bearing north 30° east — Gull Island, a small island in the pond, bearing north 74° east; thence, due south, across the marsh and beach, unto the sea, or ocean. And from the same rock, south 55° east, across Squibnocket Pond, to a rock on Hillman's Point, so called, on Squibnocket; thence, north 10.5° east, crossing said pond, to the southern end of a stone wall on Nashawaqueedsee, which parteth that neck from Gay Head; thence, north 25° east, three rods, by said wall; thence, north 47.5° east, sixty-seven rods, by said wall; thence, north 26° east, three and three-quarter rods, by said stone wall, to its northern end, by Menamsha Pond. Thence, north 50¼° east, crossing said Menamsha Pond, in the direction of a rock upon Pease's Point, so called, distant about four hundred and fifty rods, until it strikes the middle of the channel, or outlet, from said pond to the Sound; thence by the middle of said channel or outlet, as the same now is, to a point marked A on the plan accompanying this report, distant 130 feet north 40° west (true meridian) from the stone bound to be placed on the south side of the old highway opposite Tilton's house, leading down to the shore; thence on the same course north 40° west 1,170 feet; thence north 29° west (true meridian) to a point in the general division line of tide water in Vineyard Sound as located and defined by the Board of Harbor and Land Commissioners pursuant to chapter 196 of the Acts of 1881; and the right is hereby granted to either and both the towns of Gay Head and Chilmark to dig, divert and maintain the outlet from Menamsha Pond upon the course from the aforesaid point

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A to the Sound, and to dam any other outlet then or thereafter existing.

Wareham and Bourne Boundary Line.

On May 25, 1896, a petition was received from the town of Wareham requesting the Board to mark on the highway bridge across Cohasset Narrows the boundary line on tide water between Wareham and Bourne as located and defined under chapter 196, Acts of 1881.

On June 5, 1896, after due publication of notice thereof, a public hearing was given at Buzzards Bay, the selectmen of both towns and the county commissioners of Plymouth County being present. Counsel in behalf of Bourne protested against any action being taken by the Board, claiming that the Board "has no jurisdiction in said matter, and no right or power to decide where the boundary line is on tide waters between said towns; that the question of where the boundary is between said towns is one that can alone be determined by the Legislature."

The boundary line which the town of Wareham wanted marked on the highway bridge at the point of intersection therewith was located and defined by this Board and a report made thereon in May, 1883, and filed with plans in the registry of deeds at Plymouth and Barnstable. It was defined as the boundary line between Wareham and Sandwich. Bourne was set off from Sandwich by chapter 127, Acts of 1884. At the locality where the bridge crosses the stream, the boundary line is described in the report aforesaid as "following the central line of Cohasset Narrows." The Board decided that it was its duty on the petition before it to find the location of the boundary line theretofore defined at the point on the bridge where it crossed the "central line of Cohasset Narrows," and to set a mark at that place for the purpose of ascertaining and showing where the boundary line between Wareham and Bourne is, and not with a view to altering an old or fixing a new boundary line. Accordingly the necessary survey was made and the "central line of Cohasset Narrows," where it was crossed by the bridge, was found, and a mark set thereon to indicate the boundary line at that point.

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Province Lands.

The experience of another year with the Province Lands shows most satisfactory results. While many of the shrubs and young trees perished, many again survived, and the beach grass planting demonstrates that it can be relied on to hold down the sand and prevent the movement that has endangered the forest growth, and which without restraint might ultimately threaten the town.

It is obvious that the work of planting with beach grass must be first, and then that must be followed up by planting shrubs and trees of rapid growth, interspersed with those of slow growth, before the labor of planting shall be completed. Experiments are making in the nursery and in the open for the purpose of ascertaining what kinds of shrubs and trees are best adapted for growth and development under the exposed conditions inseparable from this locality. It is hoped that some species of the willow may find here congenial soil, or that some pine, by a yield of pitch, may in a measure help bear the cost of maintenance. That, however, is not a question of the immediate future, and can be brought forward and discussed after we have succeeded in finding the growth best adapted to the prevailing conditions.

The Board made two visits to Provincetown during the year, one in July and one in October, to renew directions and observe the work carried out under the appropriations of the last Legislature. There are certain persons who claim that they have, by long occupation and improvement, a moral right to enjoy the fruits of certain parcels of the Province Lands, and that the passage of chapter 470 of the Acts of 1893 was not intended to oust them from their possessions, but that they have a right to go on pasturing cows, cutting hay and cultivating cranberries as of yore. Thus far the Board has avoided an open rupture with these people by dealing gently with them, permitting them to go on largely as before, but narrowing their enjoyment and occupying the premises claimed by them when wanted for immediate use for planting. The Board held a public meeting at the town hall in Provincetown, in July, and listened

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to the claims presented, and announced to the claimants that their possessions were only at sufferance, and would have to give way as the requirements of planting developed. Meanwhile the Board had caused to be posted a warning* against the destruction of any vegetable growth on the Province Lands under penalty of trespass. As fast as it can conveniently be accomplished without open violence, these possessions, however, will have to be yielded up for tree planting.

The discussion of further details relating to the care and management of the lands and the nature of the vegetation best suited to bind the sand and produce a mature growth would be little more than a repetition of the subjoined reports of the Superintendent and the Landscape Engineer to the Board.

Report of the Superintendent.

Provincetown, Mass., Dec. 1, 1896.

To the Board of Harbor and Land Commissioners.

Gentlemen: — As superintendent of the province lands I respectfully submit the following report for the year ending November 30, 1896.

The work upon the province lands has been carried forward on about the same lines as in 1895. As the work of that year proved very satisfactory and seemed to accomplish the desired ends, it was deemed wise to continue it on the same lines as the best that could be adopted for the accomplishment of the work desired.

About the middle of April we again commenced the work of beach-grass planting and continued it from the point where it was suspended in the fall of 1895, and extended it along the slope toward "Nigger Head" about 1,000 feet, covering about 8 acres, continuing the work until May 17, when this line of work was suspended until September 28, when it was resumed and another section of about 8 acres was covered, making in all, this season, about 16 acres, and extending along the slope about 1,700 feet; covering in all since the work began, in the spring of 1895, an area of about 29 acres and a distance along the slope of about 4,600 feet. The condition of this work up to the present time is very satisfactory, although planted along one of the most exposed slopes within the lands. The work of 1895 withstood the severe northwest gales of last winter without showing a single break or the least drifting of

* See Appendix E.

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sand in the whole area covered, and there is no reason to doubt that the work of the season of 1896 will prove equally satisfactory.

Besides beach-grassing we have covered with brush a considerable area along the top and southern slope of the same range where the beach-grass is sparsely growing, to prevent any further movement of the sands there, and this will allow the grass to spread from that already growing there and eventually cover the whole area without the necessity of transplanting. As we have said in former reports the main point to be gained in the work of reclaiming these lands is holding the sands in place, and there has been no better method devised or suggested than the one adopted and followed for the past two seasons. As in 1895, we have during the past season in addition to the beach-grass planting and brushing, transplanted from the nursery a large quantity of trees and shrubs along the foot of the slope mentioned, viz.: about 1,500 young pines, about 10,000 Scotch broom and about 5,000 other young trees and shrubs divided about equally among locust, white birch, alder, tamarix, ailanthus and hornbeam; have also put out about 5,000 silver poplars which were collected in this vicinity. Of these varieties all are doing well and showing satisfactory results, except the ailanthus and hornbeam, which, I think, will be of little value for this work.

The results of the Scotch broom planting this season have been very good, although the experiment tried with this shrub the first year proved an entire failure, owing to the very unfavorable conditions. The first experiment was made in the barren sands, and the drifting sands killed it at once. This year the planting was among the recently planted beach grass, where the sands remain still, and as a result 75 per cent. of the plants survived the transplanting and made quite a vigorous growth, and are now showing finely. This shrub now gives promise of being one of considerable value for the work; its value will be fully tested during another season.

The silver poplars and pines of the planting of 1895, as well as those of this season, are in a flourishing condition and seem to give evidence of being the most valuable for the purpose desired. I have received during the season about 5,000 tamarix, 1,000 of which we planted directly in the vicinity of the beach-grass work, and the other 4,000 put into the nursery, good results having been obtained in both cases. We are of the opinion that this shrub also may be used very profitably.

In addition to the tree and shrub planting, we have, during the season, made use of considerable quantities of seed, particularly of pine seed, which has been planted in different spots among the

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beach grass, rather as an experiment. The seed germinated quickly, and judging from the present appearances of the young plants very gratifying results may be expected from this method of work. If successful, the area can be covered with tree growth much quicker than if we have to depend entirely upon nursery stock for transplanting.

We have continued the work upon the nursery and enlarged it considerably, and have now growing therein about 200,000 young plants, mostly pines of one and two years' growth, many of which will be available for transplanting another year.

We have extended the road in the direction of the Race Point Life Saving Station as far as Grand View Hill, a distance of about 650 feet, and it has been much travelled during the past season by persons from all sections of the State, to many of whom this possession of the Commonwealth is a revelation. We have also made repairs upon the other roads leading through the province lands sufficient to make them safe and convenient for public travel.

The season has been generally favorable for the work that has been carried on, although in the early part the drought interfered somewhat with the work of transplanting, but later the general conditions of weather changed for the better and worked much in our favor.

Of the appropriation for 1896 about $500 has been expended in road building and repairing, and the balance in the work of tree planting, nursery work, beach-grass planting and brushing, and for other necessary expenses.

We would recommend the continuation of the work on the lines followed for the past two seasons. A much larger appropriation could be used profitably each year, and the time required to accomplish all that is desired upon these lands will depend largely upon the amount appropriated each year.

Respectfully submitted,

JAMES A. SMALL,
Superintendent, Province Lands.

REPORT OF THE LANDSCAPE ENGINEER.

To the Board of Harbor and Land Commissioners.

GENTLEMEN: — In compliance with your request, I would respectfully submit the following as a result of my partial study of the Province Lands at Provincetown, Mass., regretting that circumstances have been such as to preclude a more thorough and complete examination of the territory in question.

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Being informed of the wishes and policy of your Board as regards the immediate treatment of this area, which I understand to be primarily to arrest the drifting of the sand toward the town and harbor, I have endeavored to furnish such suggestions and information as to me seemed best adapted to speedily and economically accomplish that result. All authorities agree that the only effective means by which this can be done is by clothing with a vegetable growth all areas susceptible to the wind's action.

As to the kind of growth best adapted for this purpose, different opinions have long existed. Inquiry shows that many thousands of dollars have been expended in the past in planting beach-grass (*Ammophila arundinacea*), that the citizens of Provincetown for many years annually went through the form of electing a "Beach Grass Committee," that considerable legislation has been enacted and re-enacted with a view to stopping the drifting of the sand, but in spite of all, it continued its onward march. I do not wish, however, to be understood as condemning the planting of this grass, — on the contrary, I am convinced that the sand hills are much farther from the town now than they would be had this work been left undone; and, indeed, I believe that the sand might be kept in a condition of perpetual quietude by its use alone, but only by constant watchfulness and attention to breaks as soon as they occur, which could only result in a perpetual tax upon the Commonwealth, with insufficient resultant compensation.

A more permanent growth of woody plants, capable of withstanding the harsh salt winds, seemed to be a more rational solution of the problem. Experimental plantings proved the advisability of first covering the area to be treated with grass, and following it with the woody growth. This method, which has been adopted and faithfully pursued by your superintendent, shows satisfactory results, as is evidenced by the result of this year's work.

The complete reclamation of this entire area now only depends upon the amount of money appropriated for the work.

To the question of the ultimate uses to which these lands might be put, and their adaptability for such uses, as well as to whether or not they might be made a source of income to the Commonwealth, I have given some thought, and while I would not attempt, with the limited study which I have been able to make, to exhaust the possibilities which here exist, I am fully convinced that future generations will show a heretofore unexpressed gratitude to our fathers for so faithfully maintaining the State's ownership in these lands, which I believe, in time, is destined to prove one of our richest possessions.

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Here the annoying problem of private ownership has not to be met, the Commonwealth now being in undisputed possession of these thousands of acres of the grandest and fairest scenery in all our broad land, with many miles of open ocean shores, always free for all who wish to use it, your Board being in the unusual position of being able to begin operations without the customary embarrassment of requiring large appropriations for the acquirement of title.

Each succeeding year shows an increasing interest in these lands, not only by the people of this Commonwealth, but by those living in other sections of the country as well.

Here we find three thousand or more acres of sand, not level and uninteresting, but attractive in the extreme — a most happy combination of the "beautiful," "picturesque" and "rolling;" high hills, some sloping gracefully from base to summit, others steep and cliff-like, some terminating in level plateaux, others in sharp ridges; all giving evidence of having been "lashed and torn by the storms of ages," and suggesting thoughts of energy, power and violence; yet amidst all this turmoil of wildly drifting sand dunes may be found quiet, deep vales, which bring thoughts of rest and peace; broad meadows, the home of the "shore bird," stretching out on either hand, clothed in places with tall, wavy grasses, and brightly tinted here and there with the rich colorings of the cranberry, salicornia and other examples of "Nature's glory." Here, also, may be seen bodies of pure crystal water, where the pond lily grows to a high state of perfection, and where other aquatic, sub-aquatic and bog plants find a congenial home. Large areas covered by a surprisingly luxuriant growth of trees, shrubs, and vines, and an almost innumerable number of herbaceous plants, as well as representatives of many families of annuals, meet the eye at every turn.

Nowhere has it been my privilege to witness so truly magnificent a growth of wild roses as we here find. They appear to spring spontaneously from the ground all through the wooded area. The depth of coloring found in their flowers, and the prolific production of fruit, together with the healthy vigor of their growth, is evidence, without cost of experiment, that other members of this numerous and interesting family may be added to the greater glory of the whole.

It would be difficult to find an equally extensive area, where the growth is so diversified and attractively luxuriant.

Here may be found the oak, beech, birch, maple, hornbeam and other native hard woods of our inland hills, working in perfect harmony with seashore plants, salt marsh and beach grasses, and other marine growths.

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Many will be surprised to learn that the beautiful American heather (*Calluna vulgaris*) grows freely here, not in small patches, or isolated specimens, but acres and acres are here carpeted with this interesting plant in its best form and color; here, also, the growth of the bearberry (*Arctostaphylos Uva-ursi*), a plant now extensively used by our leading landscape architects as a "ground cover" in ornamental plantings, is well worth going many miles to see.

Our experimental work shows that many introduced European species of trees and plants readily adapt themselves to the conditions here existing. Among them may be mentioned the Scotch broom (*Genista scoparia*), French tamarisk (*Tamarix gallica*), European birch (*Betula alba*), Scotch and Austrian pine (*Pinus sylvestris* and *Austriaca*), and the seaside pine (*Pinus pinaster*, or *maritima*). This latter variety will prove most valuable in the solution of this problem, as is evidenced by what has been accomplished by its use in foreign countries, where by its use thousands of acres of communal forests have taken the place of an equal area of drifting sand desert, and are now paying a liberal revenue to the planters.

No doubt many other species will be found, as the work progresses, equally attractive and as well adapted to serve your purpose as those mentioned.

For the propagation and growing of the necessary planting material, the nursery which you have established there will continue to prove, as it has thus far done, a desirable and necessary adjunct. While much of the desired forest covering can best be produced by direct seeding, it is also true that many species required for the accomplishment of the desired result must of necessity be grown from cuttings; I therefore think you will find it advisable to continue this branch of the work.

I am pleased to say that the result of the nursery work this year has exceeded my expectations; the nature of the soil is such that, with your thoroughly effective, yet inexpensive, system of surface irrigation, combined with the faithful attention of your superintendent, the quality of stock produced is equal to the very best.

With all the existing conditions and facilities at your command, it becomes only a question of time when these lands can be completely reforested, thus not only removing all danger to the town and harbor from the drifting of the sand, but you will also have added materially to the value of this possession of the Commonwealth. It may then be maintained and treated as a forest reservation, which by judicious management, will become a source of revenue to the State by the sale of its products. In this same

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connection, it might be stocked with game, which may be easily protected, owing to the fact that it is principally surrounded by water, and a considerable revenue would follow a sale of shooting licenses. The value of this feature might be materially enhanced by planting game cover and food-producing plants; the cost of such plants would probably not be more than of those with which you would naturally bind the sand. I would recommend the immediate planting of the shores and shallow borders of the fresh-water ponds with wild rice, and think it would soon be followed by an influx of mallard, black and wood duck, as well as other water fowl.

These lands might also be made into a park, as has often been suggested by others, but the conditions which here exist for its development into a most unique, beautiful and available park, for the enjoyment of all, are so favorable and the scope of this question is so great, that I do not deem it advisable to here discuss this feature. But whether or not these lands are to be devoted to either of the uses mentioned, the same method of operation which now obtains should be followed for at least a number of years; for any purpose, practically all of the "outside area" should be returned to forest growth. It would, however, be advisable to prepare specific planting plans, in order that any possible errors may be avoided. In order to prosecute this intelligently, a close topographical survey of the area to be treated should first be made, and herein your department is well equipped for this work, as you already have an organized party of engineers, with every facility at hand in your office.

I would urgently recommend that measures be taken at once to exclude the tide water from the "Race Run," which might be accomplished at small expense. If this is done, several hundred acres which are now intermittently covered by salt water would soon become a broad and beautiful fresh meadow, which would readily yield to the process of reclamation, and might in a few years be covered with a desirable growth. This area, which would thus become especially adapted for the purpose, might be planted with asparagus, and ought to result in large profit to the State.

Again, it would be well adapted, I believe, to the growing of the basket osier (*Salix viminalis*), which is imported from foreign countries to the extent of thousands of dollars' worth every year. I have been informed by our basket and furniture manufacturers that they prefer the best quality of native grown to the imported stock. To reach the highest degree in quality, it should be grown on "sandy bottom land," which we have here in abundance. By doing this, we not only utilize this waste and unproductive land,

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but the growing, cutting, and preparing of this product would furnish labor to many of our people. It should be grown for three years before cutting; after this period it produces an annual gross income of from $150 to $200 per acre, according to the experience of those commercially engaged in growing it elsewhere.

In addition to these facts mention should be made of the very favorable sanitary and climatic conditions which here exist, and which make this locality an ideal one in which to reside for at least a portion of the year; and I am inclined to the belief that at no very distant day we shall see a most prosperous community occupying the now naked shores of Cape Cod, which will naturally require that this area be given more thought, and, in fact, result in its being devoted to public park purposes.

Respectfully submitted,

LEONARD W. ROSS,
Landscape Engineer.

BACK BAY LANDS.

Upon petitions of the owners of certain lots on the northerly side of Boylston Street, between Arlington and Berkeley streets, in the city of Boston, the Board, believing that the objects for which the restrictions were originally inserted had been fulfilled, upon the receipt of adequate consideration, gave releases from the restriction in deeds from the Commonwealth of these lots prohibiting the use of the land for mercantile purposes.

CLAIM OF THE FISK HEIRS.

The suit begun by the Fisk heirs against the Commonwealth, under the provisions of chapter 49 of the Resolves of 1895, was finally adjusted to the satisfaction of all parties interested, and a decree* entered defining the boundary between the flats of the Fisk heirs and others and the flats of the Commonwealth, thus terminating a question of great doubt and uncertainty, owing to the destruction of ancient landmarks, on a just and equitable basis.

WRECKS.

On Aug. 12, 1896, the harbor master of Boston reported that the hull of an old wreck was floating about in Chelsea Creek, and was a danger to navigation. Upon investigation

* See Appendix F.

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it was found to be the hull of the schooner "Mary C.," of St. John, N. B., which, last spring, was wrecked on Lynn Beach, while bound to Boston. She was hauled off and towed to Chelsea Creek and her cargo of lumber discharged; the hull was then placed on the flats in the creek, from which place it was floated by a high tide. The Commissioners were unable to learn who owned her, and as they considered her an obstruction to navigation, advertised for bids for her removal, and on Aug. 18, 1896, contracted* with W. H. Wyman, the lowest bidder, to break her up and deposit the materials on the shore above high-water mark, for the sum of $210. The work was completed Sept. 14, 1896, the materials being placed on the Commonwealth's filled land at South Boston, from which place it was taken for firewood by people living in that section. The Board has given permits to parties having old timber and wood to dispose of to place it on the Commonwealth's property, from which it is quickly taken by poor people for firewood, without expense other than the labor necessary to break it up and carry it home.

On Sept. 9, 1896, the fishing schooner "Little Katy," of Boston, went ashore on White flats in Plymouth harbor. She was advertised for sale at auction by Herbert Morissey of Plymouth (per order underwriter), and was sold on Sept 30, 1896.

Upon inquiry the Board learned that the Boston Marine Insurance Company insured the vessel and, according to the statement of Mr. Morissey, ordered her sale. Oct. 2, 1896, the Board notified the Boston Marine Insurance Company to remove the wreck before Oct. 21, 1896. The insurance company replied that it had paid a total loss under its policies in full and had exercised no acts of ownership over the vessel and had nothing to do with the matter except to pay the loss. The Board has the matter under consideration.

On Oct. 28, 1896, notice was received from the office of the collector of customs at Salem that a sunken hulk had been deposited about 500 yards north of Aqua Vitæ ledge in Salem harbor, where she was an obstruction to navigation.

* See Appendix G.

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The notice further stated that the wreck was the barge "Wilkesbarre No. 2," which was towed to its present position by steamer "Henry Preston, Sr.," Robinson, master. Captain Robinson, as requested, called at the office of the Board in company with Capt. Colcord Upton, who had contracted with the owners to remove the hulk from Phillips wharf and place it on the outer beach of Baker's Island, and who had employed Captain Robinson to do the towing for him. After discussing the matter, Captains Upton and Robinson agreed to remove the wreck and place her in a position where she would not be an obstruction to navigation, on or before Nov. 15, 1896. This wreck has been disposed of to the satisfaction of the Board.

The work of breaking up and removing the wreck of the steamship "Venetian" has progressed steadily during the year under the contract with Mr. Geo. W. Townsend. It was found to be impracticable to employ enough men advantageously to complete the removal before Dec. 1, 1896, as provided in the contract, and the time has been extended to Oct. 31, 1897, at which time it will undoubtedly be fully completed.

Connecticut River.

The general care and supervision of the Connecticut River and its banks were committed to this Board by chapter 344 of the Acts of 1885. Various sections of the river lying between North Hatfield and the Connecticut line have from time to time been brought to the attention of the Board and of the Legislature since 1885 by petitions for the erection of structures on the river and for the protection of the banks where they were worn by the waves and the current.

In 1888–89 appropriations were made for protecting the bank at the upper end of the village of Hadley, where the river threatened to break through and destroy the village. The execution of the protective work was carried out under the direction of the Board and was very successful; but at some time in the future it will undoubtedly have to be extended a short distance farther up the river in order to preserve the benefit already realized and to prevent the river cutting in back of the protective work. It was not deemed advisable at that time to extend the work, as the

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danger was not immediate, and the construction would probably cost no more at some future time.

In 1891 appropriation was made by the Legislature for doing similar work at West Springfield. This also was executed under the direction of the Board and has completely remedied the defect.

In 1894–95 appropriations were made for protecting the bank in the town of Agawam where the river threatened to wash out the highway running along the bank. This work was carried out also under the direction of the Board and appears to be entirely successful as far as it extends. In its last report the Board estimated that it would take about $3,000 to extend the work so as to protect the whole of this section of the bank. An appropriation of $1,500 was made by chapter 95 of the Resolves of 1896, for extending the work from where it was left last year, and with this sum the Board has extended it so that the worst places have been protected. The appropriation was exhausted before the work as laid out was completed. The final item was paid by the town of Agawam, which donated the sum of $69.95 for the purpose. There still remain in this stretch of about two miles of river places where the expenditure of a small sum of money now in planting willows and seed may prevent the river from undermining the bank and making breaches which in the future will require much larger sums to repair. The details of the protective work as extended this year will be found in the report of Messrs. E. C. and E. E. Davis, civil engineers in charge, to the Board.

In connection with this protective work and with studies for locating a river line at Springfield, which was established by chapter 301 of the Acts of 1893, surveys of portions of the river have been made, but up to last year nothing had been done towards the general survey provided for by chapter 344 of the Acts of 1885. By chapter 77 of the Resolves of 1896, $1,000 was appropriated for beginning these surveys. This was done on the recommendation of this Board in its last annual report, suggesting that it was a work which could be carried on advantageously by small appropriations made from year to year, and that the present was a favorable time to begin the work. The town bound-

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ary survey of the Topographical Survey Commission is now being prosecuted in that vicinity, and the triangulation stations and signals erected upon them formed the best basis which could be used for the survey, and by using these a great saving could be made in the cost of the work. The work was started in July and was continued through August, a triangulation being completed from a point just below the great bend at Hadley north nearly to the northerly line of the town of Hatfield. The map was extended from the southerly limit of the triangulation work about five miles up the river, when the field party was taken away to do some pressing work in connection with the dredging in Boston harbor. It was expected that the party could return and complete the first sheet of the survey in the fall; but, owing to the demands of other work in the office, this became impossible, and as it is not deemed advisable to employ new hands to complete the work on this sheet this year, it will have to lay over until the spring. The design of this survey is to place in the records of the county, and of the Commonwealth, an accurate plan of the river, which shall thereafter be the basis for determining the exact amount of the changes which are taking place, and be used as the groundwork in all future studies of the river. The work of the Topographical Commission is on too small a scale to be used for this purpose; but after this survey is made and recorded, it will not be necessary for it in any future maps of the vicinity to make field surveys, as reductions from this survey will be equal to the best work which would be required for its maps. As a result of this season's work, it is apparent to this Commission that it is advisable to continue the survey from year to year, to cover at least the portion of the river where active changes in the banks are now taking place. The mapping of the portion where great changes are not taking place does not seem to be of so much importance at the present time. It is estimated that another appropriation of $1,000 (being the same sum appropriated last year) can be profitably expended the coming season, and it is expected that this will enable the Board to complete the map of the river (including the work done the present season) for a distance of from 12 to 15 miles.

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To the Honorable Board of Harbor and Land Commissioners of Massachusetts, WOODWARD EMERY, Esq., *Chairman.*

GENTLEMEN: — We herewith submit our report of work done the past season on the extension of the protective works, commenced in 1894, on the Connecticut River bank in the town of Agawam, under the provisions of chapter 95 of the Resolves of 1896.

The work, as directed by your Board, has been done under the same general plan and methods as in previous years and extended down the river for a distance of 436 feet, from the point where it was suspended one year ago, to the line of the Calla Shasta property, where the highway diverges from the bank of the river. This, you will note, is 16 feet more in length than recommended in our report of 1895, as it was found, upon making surveys, that the southerly line of the land taken for highway purposes was that distance farther down the river than the line indicated by the existing fence marking the supposed northerly boundary of the Calla Shasta property.

The completion of this reach forms a continuous line of protective works for the highway and adjoining property, 2,028 feet in length up and down the river, and its effect on the general character of the river bed is noticed in the disappearance of several sand bars that were forming at different points in the river against the works previous to 1894, and also in the average increased depth of water in the easterly half of the width of the river and a corresponding shoaling in the westerly half, with the exception of one line, as indicated by comparisons made with the soundings taken across the river on different lines in 1894, before this work was commenced, and again on the same lines this season, all being referred to the same height for the surface of the water in the river.

The accompanying cross-sections * of the river bed show these changes, No. 37 being at the extreme upper end of this reach of the work and No. 48 being 200 feet below the lower end of this season's work.

The exception above referred to is at No. 45, which is 100 feet below the highway culvert and near the point where the river broke through the new highway embankment in the freshet of January, 1896. We attribute the abrupt deepening of the channel near the westerly bank of the river at this point to the back rush of water from the meadows on the westerly side of the highway, through this washout, caused by the rapid fall in the river after it had reached its maximum height in this freshet.

* Not printed.

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The number of square yards of surface covered by mats and stone riprapping on this part of the work the past season is 1,721, at a total cost of $1,222.98, or 71 cents per square yard. The remainder of the appropriation, $277.02, has been expended on the river bank commencing at a point about 7,175 feet above the upper terminus of the work done in 1895, and immediately below the homestead of James Green, and extending 130 feet in length down the river, covering 520 square yards of surface, at a cost of 66 cents per square yard.

The amount of the appropriation left unexpended not being sufficient to finish this section of the river bank that had been graded and fitted to receive the mats and riprap work, the town of Agawam assumed the additional cost, amounting to $69.95, and the work was completed as far as any break has been made in the bank by grading or other work.

The contract for furnishing the stone for the season's work was awarded to Fred P. Stanton of Huntington, Mass., for $1.78 per cubic yard, delivered at the river bank. 204.2125 yards of stone have been used, and the quality of stone and delivery have been satisfactory.

The remainder of the tract of willows bought of John D. Colton, 2d, in 1895, and not used that year, has been used in the past season's work, and the balance needed was bought of David Booth of Longmeadow and C. L. Campbell of Agawam at a cost of $21.75.

Work was commenced August 3 and closed September 30, local help being employed under the supervision of W. C. Campbell, who has been employed in that capacity since the work was first begun.

We recommend that the work below the James Green homestead be continued next season down the river to a point where the present growth of willows, etc., forms a sufficient protection to the bank from farther encroachments of the river.

There are also places on the bank opposite the house of S. Clark where the expenditure of a few dollars at the present time on weak places would be good economy on the part of the State.

Respectfully submitted,

E. C. AND E. E. DAVIS,
Engineers.

NORTHAMPTON, MASS., Nov. 2, 1896.

In November, William H. Niles, Professor of Geology at the Massachusetts Institute of Technology, at the invitation of the Board, accompanied its engineer in an examina-

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tion of the Connecticut River, at those points especially at which the recent appropriation of the Legislature had been expended. A letter received from him by the Board, relative to his observations, is both interesting and instructive, and is as follows: —

MASSACHUSETTS INSTITUTE OF TECHNOLOGY,
BOSTON, Jan. 22, 1897.

WOODWARD EMERY, Esq., *Chairman of Harbor and Land Commissioners.*

SIR: — I have the honor of submitting to you a report upon some observations made in company with Mr. F. W. Hodgdon, relative to the destructive agency of the Connecticut River at certain localities in Massachusetts.

An examination was made of the right bank of the river below Springfield, including the portions which have been protected in the town of Agawam.

An unusually straight reach of the river extends from the bend indicated on the map * by the letter A,† to the slighter bend beginning at B.‡ The river here has more than its average width, the current is relatively slow and its greatest movement is some distance from the right bank. At B, where the last protective work has just been completed, the river begins to curve to the left, and consequently the right bank there and along the bend is more exposed to the action of the current. But the wearing of the bank between A and B requires some further explanation.

I agree with Mr. Hodgdon in the opinion which he has formed that the wear of this portion of the bank is due more to the action of the waves than to the influence of the current. Quite an extent of the river is here exposed to the sweep of the southerly winds, which naturally produce considerable wave action. At the locality where the last protective construction has been completed the river begins to curve toward the left, and consequently the right bank here, and for some distance below, is more exposed to the action of the current. I believe that the character of the bank itself at this place is an evidence of such action.

But, above this point, where the river threatens encroachment upon this bank, and even upon the highway, another fact is worthy of consideration. The soil is very fine in texture, and where not held in place by growth of vegetation, it is very easily denuded by running water. If the soil had the same cohesion that may be observed in some other portions of the river banks, the erosion would be less. The cause of the fineness of the material consti-

* Not printed. † The point A is directly opposite the mouth of Pecowsic Brook.
‡ The point B is at the northerly end of the Calla Shasta camp ground, in Agawam

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tuting the bank at this particular place is a topic which possesses some interest.

The loose materials which occur in the valley are naturally classified in three groups which may be described in the order of their age. The first group of unconsolidated materials includes those which were deposited by glacial action. To this group belong the erratic bowlders and pebbles often associated with coarse gravel, but always unstratified, and which form in places quite irregular mounds, hillocks and ridges. The group also includes the stony clays, likewise unstratified, and which constitute at some localities the most veritable hard-pan of the valley.

In the second group we have those stratified sands and gravels, which in some places form plains considerably elevated above the level of the river, and which are often of considerable extent. In this same group are certain stratified clays which are commonly known as brick-clays. The stratified structure presented by the materials of this second group shows that they have been deposited by water and not by ice. At many places these deposits lie upon or over those of the first group, and this position proves their later age.

The third group includes the soils which constitute the actual surface of the ground. At many places in the valley these soils are simply fine sediments which have been deposited from the waters which in flood seasons overflow some of the lower grounds, and they have consequently been called alluvial soils. These vary considerably in fertility at different localities, but they are always fine and usually quite loosely aggregated. The right bank of the river, at the locality under discussion, and represented upon the map between A and B, is composed of this third group of materials, and it is, therefore, easily worn or carried away by the action of running waters unless protected by vegetation. In examining this portion of the river bank it was readily observed that wherever a road or pathway had killed or removed the vegetation which had grown upon its surface, the weather and the waters acted most readily in channelling and removing the soil. At some other places it was very evident that the natural growth of vegetation is serving an important purpose as a protective agent.

I was glad to observe that at a few of these places your Board has taken active steps to prevent the beginning of denudation at points where the continuity of the vegetation had been broken. I would recommend that this bank be frequently visited for the purpose of ascertaining if the surface has been deprived of its protecting vegetation by the formation of pathways, by boat landings,

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or by other means. I would also recommend that, as far as practicable, measures be taken to prevent more pathways being formed by domestic animals or human beings than are essential, and when they are needed that protection be given by the use of stones or other firm substances. I would further recommend measures to promote plant growth, which may be easily accomplished by the use of willows. It seems to me that the protection of this portion of the bank need not be an expensive one, but that some degree of caution is needed to prevent the beginnings of wearing action. As the waves, to which reference has been made, are features of the surface of the water, and as the river current has but little influence, excepting at times of flood, it seems to me that the danger of undermining the banks below the average level of the river surface is not very great.

Another locality which we examined is in the town of Hadley, south of the village and on the left bank of the river, at the place indicated on the map by the letter C.* The river here turns quite abruptly from an easterly to a southerly course. At the bend the channel is narrow and the current has considerable energy. Just below the most abrupt portion of the bend there outcrops, from the lower portion of the bank, a bed of clay of the kind described as brick-clay. The top of the clay-bed was but little above the surface of the river at the time of our visit, a day when the water was higher than usual, but the river was not flooded. It was obvious that this clay-bed retarded the wearing of the bank by the river. We observed that the current, washing the edge of the clay, was continually carrying away exceedingly fine material in suspension, but the adhesive nature of the clay obstructed the usual process of undermining, and the bank was thereby measurably protected. Should it eventually be found desirable to give artificial protection to this bank, the clay at the bottom will be found very serviceable as a foundation upon which to place any construction that may be adopted.

Below this bend, at the locality indicated upon the map by the letter D †, the clay-bed did not appear. At this location the general surface is lower than at the bend. Only a portion of the river flows between Shepherd's Island and the left bank, but with a strong current which is apparently making quite an inroad upon the meadow. Judging from the laws of flowing streams and the yielding of their banks, I predict that the erosive power of the river here will increase rather than diminish, and I anticipate that it will not long be possible to maintain the highway in its present posi-

* The point C is about three-quarters of a mile north of Shepherd's Island.

† The point D is opposite Shepherd's Island.

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tion. As the land here is not very valuable, and as the road can be easily moved to another location, it will perhaps not be regarded as essential that any work for the protection of the land be done here. As the bed of clay which occurs at C does not appear here, the erosion will be greater, although the bank is less exposed to the power of the current. The absence of the clay bank at this locality I explain as one of the results of ancient action, when the volume and the velocity of the stream were greater than at present.

I was also interested in the success of the efforts for the protection of the caving bank near the northern end of Hadley Street, marked E * upon the map. It is quite evident that this work must soon be extended farther up the stream. I was much pleased to see that the method adopted of sloping the bank, of placing stones and the planting of willows, has proved to be so effective. I think the work which has been done leads us to confidently expect that this important portion of Hadley, which is most exposed to the destructive energy of the river, may be protected by these comparatively inexpensive means.

I was very much interested in examining the bank of the river where it makes a very sudden turn near the two railways north of Northampton, at the place marked F † upon the map. There is no danger whatever of the river extending its curvature any farther in a westerly course. The occurrence of the hard, crystalline rock near this location, the existence of an old glacial moraine forming a resisting buttress on the southerly side of this curve, with an accumulation of clay filling the space between them, furnish a substantial natural protection. As the clay is being removed for the purpose of brick making, it may be advisable to watch the progress of the excavation or place some restriction upon it; but as it is at present, I do not see that there is any danger at this point.

Respectfully submitted,

WM. H. NILES.

CHARLES RIVER.

The work of the Charles River Embankment Company the past year has been confined to completing the filling of the streets on its property east of Massachusetts Avenue. The gravel for this work was taken from the flats of riparian owners near West Boston bridge, on the Cambridge side of the channel, outside the harbor line.

* The point E is on the left bank of the river, on the northerly side of Hadley village and between its two principal streets.

† The point F is at the extreme westerly part of the great bend opposite Hadley and about one-quarter mile above Elwell Island.

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This work has not affected the tidal volume and has not directly improved the facilities for navigation, as the flats dredged are at a considerable distance from the existing channel; but it leaves just so much less to be removed at some future time, when the whole basin will undoubtedly be excavated to remove the unsightly flats.

A quantity of gravel from the flats of the Commonwealth, near the channel, was sold to Lyman Boynton, to be used in making the beach at the new North End Park of the city of Boston, at 15 cents per cubic yard, and the sum of $500 has been collected and turned into the treasury.

Between West Boston and Craigie's bridges the work of filling on the Cambridge side of the river, which was described in our last report, has been continued during the year, but is still in an unfinished condition. Very little of the filling has been taken from the river, but is mostly composed of ashes and other refuse material brought in carts from Boston and Cambridge.

A short section of the river bank on the Cambridge side, above Boylston Street bridge, has been improved and a beach constructed by the Park Commissioners of the city of Cambridge, and it is expected that further improvements will be made in the near future.

Massachusetts Maritime Canal Company.

On Aug. 17, 1896, a petition was received from the Massachusetts Maritime Canal Company, for the approval by the Joint Board of Railroad and Harbor and Land Commissioners, under chapter 542 of the Acts of 1896, of an issue of stock and bonds. After public notice and hearing, the following order was passed: —

In Board of Railroad Commissioners and Harbor and Land Commissioners, sitting as a Joint Board.

September 29, 1896.

In the matter of the petition of the Massachusetts Maritime Canal Company for the approval by the said Joint Board, under chapters 542 of the Acts of 1896, and 462 of the Acts of 1894, of an issue of capital stock by said company to the amount of $6,000,000, and also of an issue of bonds by said company to the amount of $6,000,000, for the purpose of building and equipping

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a ship canal, and of defraying the cost and expense incident thereto, as set forth in said petition, —

It appearing, after public notice and hearing, that said company has been chartered by said chapter 542 of the Acts of 1896 for the purpose of constructing and maintaining a ship canal extending from Buzzard's Bay to Cape Cod or Barnstable Bay, through the towns of Bourne and Sandwich, or either of them, with an authorized capital stock of $6,000,000, and with authority also to issue bonds not to exceed its capital stock at the time actually paid in; and

It being deemed by the said Joint Board that an issue of capital stock and an issue of bonds by said company to an amount not to exceed $6,000,000 each, to be issued from time to time, as hereinafter provided, may be reasonably requisite for the purposes for which such issues have been authorized as aforesaid; it is

Ordered, That the said Joint Board approve an issue by the said Massachusetts Maritime Canal Company, subject to the provisions of all general and special laws applicable to such issue, of not to exceed in the whole 60,000 shares of its capital stock, amounting at the par value thereof to $6,000,000, and of not to exceed in the whole at the par value thereof $6,000,000 of its bonds, payable at periods not exceeding fifty years from the date thereof, with interest at a rate not to exceed five per cent. per annum, and secured by a mortgage of its franchise, canal equipment, and all of its property, real and personal; the said stock and bonds, or the proceeds thereof, to be applied to the purposes set forth and specified in said chapter 542 of the Acts of 1896, and to no other purpose; and the issues of the said stock and bonds to be made in the manner and upon the terms and conditions following, and not otherwise: —

1. The capital stock of said company shall be duly subscribed; and said company shall be duly organized, and its corporate organization shall be duly maintained, as regards the choice of officers and otherwise, in the manner provided in the general laws of this Commonwealth relating to railroad corporations. It shall have its office and hold its meetings in this Commonwealth; and its books, records and contracts shall be submitted to said Joint Board, whenever requested by it, for examination.

2. No shares of stock or bonds shall be issued except upon payment of the par value thereof in cash, or in payment for labor performed and material furnished in construction, or in payment for property acquired, as authorized by said chapter 542 of the Acts of 1896.

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3. All certificates of stock and all bonds of said company shall be certified and issued only by and through the New England Trust Company, of Boston, or some other Massachusetts trust company approved by said Joint Board, under an indenture of trust of which the terms and conditions have been also so approved; and the same trust company shall be made the trustee in the mortgage securing the bonds.

4. Upon the due authorization by votes of the stockholders of said canal company of issues of its capital stock and mortgage bonds to the amounts aforesaid, and upon the due execution and delivery of such indenture of trust and mortgage, said canal company may execute and deliver to such trust company its certificates of stock and mortgage bonds to an amount not exceeding at par $6,000,000 each; but the said certificates of stock and bonds shall be certified and issued by such trust company only as follows: —

(1) Stock to the amount of $100,000, and bonds to a like amount, shall be certified and issued to said canal company, or its order, as soon as a deposit of $200,000 has been made by said canal company with the treasurer of the Commonwealth, in accordance with the provisions of section 23 of said chapter 542 of the Acts of 1896.

(2) Said trust company may certify and issue in like manner such further amounts of stock and bonds, not to exceed in the aggregate (including the issues above mentioned) $6,000,000 each, as from time to time, on the application of said canal company, shall have been approved and certified by said Joint Board, in the manner provided in chapter 462 of the Acts of 1894, as reasonably requisite to enable said canal company, promptly and in good faith, to carry out the purposes set forth and specified in said chapter 542 of the Acts of 1896: *provided*, that the total amount of bonds so approved, certified and issued shall at no time exceed the total amount of capital stock then actually paid in and outstanding as aforesaid.

JOHN E. SANFORD,
WILLIAM J. DALE, JR.,
GEO. W. BISHOP,
Railroad Commissioners.

WOODWARD EMERY,
CHAS. H. HOWLAND,
Harbor and Land Commissioners.

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On November 13, 1896, the Joint Board, under chapter 222 of the Acts of 1887, executed the following order dismissing the petition of the Cape Cod Ship Canal Company, dated October 22, 1891: —

IN BOARD OF HARBOR AND LAND COMMISSIONERS AND RAILROAD COMMISSIONERS, SITTING AS A JOINT BOARD.

NOVEMBER 13, 1896.

In the matter of the application of the Old Colony Railroad Company for the dismissal of a petition of the Cape Cod Ship Canal Company, —

It appearing, that said last-named company, on October 22, 1891, filed with said Joint Board a petition, under chapter 222 of the Acts of 1887, asking said Board to determine, *First*, the point or points at which, by alteration of the location of the Old Colony Railroad Company, it should cross the Cape Cod ship canal, and *Second*, the question whether said canal should be crossed by a public highway, and, if so, at what point and in what manner;

And it also appearing that no final order has been passed, or decision made, on said petition by said Joint Board, and that for a long time no steps have been taken in behalf of the petitioner for the further prosecution thereof; it is

Ordered, The counsel of record for the petitioner having been notified and making no objection thereto, that the said petition be dismissed for want of prosecution.

WOODWARD EMERY,
CHAS. H. HOWLAND,
Harbor and Land Commissioners.

JOHN E. SANFORD,
GEO. W. BISHOP,
Railroad Commissioners.

WORK OF THE UNITED STATES IN RIVERS AND HARBORS OF THE COMMONWEALTH.

The following statements, made by Lieut.-Col. Samuel M. Mansfield, Corps of Engineers, U. S. A., who is in charge of river and harbor improvements in eastern Massachusetts, and by Maj. D. W. Lockwood, Corps of Engineers, U. S. A., who is in charge of similar improvements in southern Massachusetts, show the work accomplished by the United States government in the rivers and harbors of this Commonwealth during the year: —

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STATEMENT OF LIEUT.-COL. S. M. MANSFIELD, CORPS OF ENGINEERS, U. S. A.

DEC. 31, 1896.

The Harbor and Land Commissioners, Commonwealth of Massachusetts, Boston, Mass.

GENTLEMEN: — In accordance with your request of the 15th inst., I have the honor to furnish the following summary of the work done by the United States during the year 1896, in those rivers and harbors of Massachusetts which are under my charge: —

1. Newburyport Harbor.

The project for the improvement of the harbor has not been changed. No work was done during the year. The river and harbor act of June 3, 1896, appropriated $16,000 for this harbor; and this sum will be expended in extending the south jetty, under a contract now in force with the Rockport, the Pigeon Hill and the Cape Ann granite companies. Operations will be commenced under this contract early next year. No survey of the bar was made during the year.

2. Harbor of Refuge, Sandy Bay.

The project remains unchanged.

During the year operations were continued under the contract with the Cape Ann Granite Company, and 115,000 tons of rubble-stone were deposited in the substructure of the breakwater.

The act of June 3, 1896, appropriated $150,000 for this improvement; and this sum will be expended in continuing the building of the substructure of the breakwater, under a contract now in force with the Rockport, the Pigeon Hill and the Cape Ann granite companies. One thousand five hundred tons of rubble-stone were deposited in the breakwater during the year, under this contract.

3. Gloucester Harbor.

No change in the project has been made.

The contract with the Rockport Granite Company was completed during the year. Under it 56,800 tons of rubble stone were deposited in the substructure of the breakwater from Eastern Point, completing about 500 running feet.

The act of June 3, 1896, appropriated $34,000 for this harbor, of which $2,000 may, in the discretion of the Secretary of War, be expended in removing a pinnacle rock in the outer harbor, a rock called "Elisha's Rock" in the inner harbor, and a rock near the ferry landing at Rock's Neck in the inner harbor. These rocks

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have been surveyed and a project for their removal will be submitted soon. The remaining $32,000 will be expended in the extension of the Eastern Point breakwater, under the contract now in force with the Rockport, the Pigeon Hill and the Cape Ann granite companies. Under this contract 1,500 tons of rubble-stone were deposited during the year.

4. Manchester Harbor.

The act of June 3, 1896, directed the Secretary of War, out of the appropriation on hand, to cause a survey and estimate of cost of improvement to be made with a view of straightening the channel between the mouth of Manchester Harbor and Proctor's Point, removing obstructions at the mouth of the channel and at the point of rocks, dredging the channel for its entire length between its mouth and the town wharf to a width of from 200 feet narrowing to 150 feet and a depth of 8 feet, and providing turning basins and anchorage for boats by the dredging of the flats for that purpose. This survey has been made, and a project will be submitted early next year.

5. Lynn Harbor.

No change has been made in the project.

The act of June 3, 1896, appropriated $20,000; but a project for its expenditure awaits the study of an examination of the channel recently made.

6. Boston Harbor.

No change has been made in the project for its improvement. Operations were conducted during the entire year under the contract of Messrs. Townsend & Johnston for the removal of the ledges uncovered by the dredging done in the main ship channel. Under this contract 3,821 cubic yards of ledge have been removed. The contract has been extended to June 30, 1897.

The act of June 3, 1896, appropriated $70,000 for this harbor, as follows: —

Improving harbor at Boston, Massachusetts. Continuing improvement, $70,000: *provided*, that this sum may, in the discretion of the Secretary of War, be used in the preservation and improvement of said harbor, including the project for improving the main ship channel, and that $7,000 of this sum may, in the discretion of the Secretary of War, be used in improving Chelsea Creek, and so much thereof as the Secretary of War, in his discretion, shall direct to be expended for the protection of Great Head, Winthrop, to prevent the further washing away by the action of

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the sea: *provided*, that contracts may be entered into by the Secretary of War for such materials and work as may be necessary to carry out the revised project of August 11, 1892, such contracts to provide that said ship channel shall be widened to a minimum width of 1,000 feet and a minimum depth of 27 feet, to be paid for as appropriations may from time to time be made by law, in the aggregate not to exceed $1,145,000, exclusive of amount herein and heretofore appropriated.

The $7,000 allotted for Chelsea Creek has been expended under a contract with the Eastern Dredging Company. The improved channel is at least 20 feet wide and 4 feet deep at mean low water to the head of navigation.

The Secretary of War has decided to expend no part of this appropriation for the protection of Great Head, Winthrop, and the balance of $63,000 on hand will suffice to supervise the continuing contract for the improvement of the main ship channel, should satisfactory prices be obtained under the call for proposals dated Dec. 16, 1896.

7. Scituate Harbor.

No active operations were in progress during the year.

The $6,000 appropriated by the act of June 3, 1896, will be expended under a contract now in force with the Eastern Dredging Company in deepening the entrance channel to 7 feet at mean low water.

8. Plymouth Harbor.

No change during the year.

9. Wellfleet Harbor.

No change during the year.

10. Provincetown Harbor.

The several works of preservation on the beaches remain essentially the same as at the close of last year.

11. Chatham Harbor.

No change during the year.

12. Merrimac River.

The act of June 3, 1896, provides for the improvement of the channel of the Merrimac River, by removing certain rocks therein below Rocks bridge, $5,000.

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The Secretary of War is directed to furnish to the House of Representatives an estimate of the cost of improving the Merrimac River, by dredging the channel thereof between Newburyport and Haverhill of the width of 150 feet and of the depth of 7 feet at mean low water, provided the estimate can be furnished from surveys already made.

A detailed survey of the rocks was made during the resurvey of the river ordered by the river and harbor act of 1894. A contract was entered into with the Eastern Dredging Company to remove these rocks and the work has been accomplished, leaving the improved channel at this locality 150 feet wide and 12 feet deep at ordinary high water in the river.

13. Powow River.

Operations were continued during the working season under the contract with Mr. Augustus R. Wright, and the channel made 30 feet wide and 12 feet deep at mean high water.

The act of 1896 appropriated $5,000 for continuing this improvement, and it will be expended under a contract now in force with the Eastern Dredging Company in widening a portion of the channel to 45 feet.

14. Essex River.

No work has been done in this river during the year. Five thousand dollars was appropriated by the act of June 3, 1896, but it is likely that its expenditure would produce no appreciable benefit to commerce.

15. Mystic and Malden Rivers.

No operations were in progress during the year. The $10,000 appropriated by the act of June 3, 1896, will be expended under a contract now in force with Mr. Augustus B. Martin.

16. Town River.

It is proposed to improve this river by dredging a channel 4,500 feet long, 100 feet wide and 4 feet deep at mean low water to the head of navigation. The appropriation of $10,000 made by the act of 1896 will be expended under a contract now in force with Messrs. Perkins & White, by which it is expected the channel will be made of full length and depth, 50 feet wide.

17. Weymouth River.

The project for Weymouth Fore River has not been changed and no work was done on it during the year. The funds made available for this improvement by the act of June 3, 1896, will be

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expended under a contract now in force with Mr. Augustus B. Martin, in making the channel 60 feet wide to Braintree bridge and completing the project above the bridge.

In Weymouth Back River it is proposed to dredge a channel 200 feet wide and 12 feet deep to the Fertilizer Company's wharf.

18. Wrecks.

The wreck of the schooner "Lillie" was removed from Broad Sound, Boston harbor, under a contract with Messrs. Duncan & Nickerson.

19. Examinations and Surveys.

The act of June 3, 1896, provided for surveys and projects for the improvement of the following: —

Merrimac River from Lowell to New Hampshire State line.

Marblehead harbor, with a view of improving the harbor by building a sea wall to protect the isthmus connecting Marblehead Neck with the town of Marblehead.

Provincetown harbor, with a view to erecting a dike for the protection of that harbor.

Neponset River.

Lynn harbor, with a view to securing a channel 300 feet wide and 15 feet deep at low water.

Boston harbor, with a view to securing a channel 1,200 feet wide and 30 feet deep from the navy yard to the entrance of the present main ship channel, and from the main ship channel in President Roads through Broad Sound channel.

Manchester harbor.

Plymouth harbor.

Weymouth Back River from Hingham bridge to Mann's wharf.

With the exception of the Merrimac River and Boston harbor, these surveys have been made and the notes are being plotted.

Preliminary examinations and reports at the following localities were also ordered: —

Gurnet Rock and other rocks at mouth of Plymouth harbor.

Duxbury Beach, with view to protection of harbor.

Duxbury harbor, with view to widening and deepening improvement.

The examinations have been made and reports will be submitted in due time.

Very respectfully,

S. M. MANSFIELD,
Lieut.-Col., Corps of Engineers.

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STATEMENT OF MAJ. D. W. LOCKWOOD, CORPS OF ENGINEERS, U. S. A.

Abstract of work of river and harbor improvements done in the State of Massachusetts by the United States government, under direction of Maj. D. W. Lockwood, Corps of Engineers, U. S. A., for the fiscal year ending June 30, 1896.

Taunton River.

The work under the contract with the Columbia Dredging Company, of Fall River, Mass., was completed. Three thousand nine hundred and forty-three cubic yards of sand, gravel, cobble stones and 1.6 cubic yards of bowlders were removed between Blake's wharf and North Dighton, completing the channel from the head of navigation to the mouth of Three Mile River.

Hyannis Harbor.

Nothing was done during the fiscal year. A contract was in force with the Hartford Dredging Company of Hartford, Conn., covering about $2,000 worth of dredging, which was completed during the season.

Nantucket Harbor.

At the commencement of the fiscal year the work of constructing the east jetty was in progress under a contract with Humphrey Toomey of Guilford, Conn., covering about $18,000 worth of stone placed in the jetty. The contractor placed 3,000 tons of core stone and 4,954 tons of facing stone during the year. The east jetty was extended 995 feet up to the level of 1.5 feet below mean low water, and the core and a portion of the facing laid for an additional distance of 210 feet, making the end of the stone work 4,840 feet from the shore.

Edgartown Harbor.

Nothing was done during the fiscal year. A contract was in force with the Hartford Dredging Company of Hartford, Conn., covering about $1,200 worth of dredging, which was completed during the season.

Vineyard Haven Harbor.

Nothing was done during the fiscal year. It is proposed to continue work next season with such funds as may be available on the work of protection to the East and West chops.

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Wareham Harbor.

No further work is at present proposed at this harbor.

Woods Holl Harbor.

At the last session of Congress an appropriation of $20,000 was made for deepening and widening the channel connecting Woods Holl with Buzzards Bay. It is proposed to expend the available funds in commencing the enlargement of the channel to a width of 300 feet and a depth of 13 feet.

New Bedford Harbor.

Work of dredging in the main channel leading from Buzzards Bay to New Bedford was practically completed, 30,979 cubic yards of material was removed, making the channel 200 feet wide and 18 feet deep. During the next fiscal year it is proposed to commence the excavation of an anchorage area 18 feet deep adjoining the channel between New Bedford and Fairhaven.

Canapitsit Channel.

Nothing was done. A contract is in force with the Hartford Dredging Company of Hartford, Conn., covering about $3,500 worth of dredging to be done next season.

Wrecks.

During the last fiscal year the following wrecks were removed so as to no longer obstruct navigation: —

Schooner "Robert Mowe," sunk in Hyannis harbor.

Schooner "Addie G. Bryant," sunk by collision in Pollock Rip Channel.

Schooner "Mary A. Heaton," wrecked and sunk about 2.25 miles south-east of Nausett Life-saving Station.

Schooner "Frank A. Magee," sunk by collision in Pollock Rip Slough.

Barge "Tivoli," wrecked and sunk about 3.5 miles N. E. by N. from Pollock Rip Light Ship.

Schooner "Wm. Wilson," sunk by collision midway between the Shovelful and Handkerchief light ships.

Unknown schooner, 4 masts, sunk one-half mile west of Pollock Rip Light Ship.

Schooner "Enterprise," sunk in Vineyard Sound one-eighth of a mile E. S. E. of buoy No. 11A, eastern end of Norton Shoal.

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Hangman's Island.

The Board has leased to Wm. J. Greenfield and James E. Glassett, Hangman's Island in Boston harbor, for the term of three years from Jan. 1, 1896, at an annual rental of fifty dollars.

This island is situated within the tide-water limits of the city of Quincy, and is subject to the jurisdiction of that city, but, having no other ownership, belongs to the Commonwealth.

Inspections Made during the Year.

1896.

Jan. 13. Site of proposed building over Charles River, in Watertown.

Jan. 22. Dinah's Pond, in Yarmouth.

Jan. 25. Site of proposed bridge in Red Brook harbor, in Bourne.

Feb. 13. Site of proposed dam at Wianno, in Barnstable.

Feb. 14. Encroachments upon Merrimac River, in Newburyport.

Feb. 27. Beach at North Scituate. Proposed removal of gravel.

March 4. Cooper's Pond, in Carver.

April 4. Green Harbor, in Marshfield, with legislative committee on Harbors and Public Lands.

April 9. Wharves of George Parker in East Boston, and site of proposed structure to be erected by J. D. W. French on Chelsea Creek, in Chelsea.

April 22. Wharf of Leonard Thompson, in Hingham.

April 24. Stillwater Pond, in Chatham.

May 1. Wharf of Nathaniel E. Harlow, in Plymouth.

May 2. Premises of Joel F. Sheppard on Weymouth Fore River, in Quincy.

May 4. Site of proposed wharf extension at Wing's Neck, in Buzzards Bay.

May 5. Premises of Amelia Swanson and Augusta De Wolf at Harbor View, in East Boston.

May 6. Site of proposed structures of the Pope's Island Manufacturing Corporation, in New Bedford harbor.

May 7. Fall River harbor. Dumping ground for dredged material.

May 8. Wharves of Melville E. Grey and Putnam & Pope, on Beverly Creek, in Beverly.

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May 11. Beach at Hough's Neck, in Quincy. Proposed removal of gravel.
May 13. Site of proposed wharf of town of Manchester, in Manchester harbor.
May 14. Fall River harbor. Dumping ground for dredged material.
May 22. Encroachments upon tide water, at Savin Hill.
May 27. Peddocks Island, in Boston harbor. Proposed removal of gravel.
May 28. Lamper's Mill Pond, in Lynn.
June 1. Beach in Cohasset. Proposed removal of stones.
June 10. Beach at Point Allerton, in Hull. Proposed removal of gravel.
June 11. Beach at Green Hill, in Hull. Proposed removal of stones.
June 15. Encroachments on Buzzards Bay, at Monument Beach.
June 18. Wharf of J. F. Appleton, at Salem Willows.
July 1. Encroachments upon Merrimac River, in Newburyport.
July 11. Province Lands, in Provincetown.
July 17. Structure in tide water, at Savin Hill.
July 24. Beach at Point Allerton, in Hull. Proposed removal of gravel.
July 25. Apple Island, in Boston harbor. Proposed removal of stones from flats.
Aug. 8. Site of proposed wharf of G. J. Bicknell, in Hull.
Aug. 10. Shiverick's Pond, and site of proposed wharf of the Vineyard Sound Wharf Company, in Falmouth.
Aug. 13. Beach in Hull. Proposed removal of gravel.
Aug. 14. Thompson's Island, in Boston harbor. Proposed removal of material.
Sept. 12. Wharf and boat-landing of Alexander Duncan, at Savin Hill.
Sept. 15. Summer street, in Lynn. Proposed widening in tide water.
Sept. 18. Wharves of the New Bedford Yacht Club, and Garfield & Proctor Coal Company, in New Bedford harbor.
Sept. 21. Site of cables across Merrimac River, in the city of Haverhill and towns of Bradford and Groveland.
Sept. 29. Wharf of Boston Electric Light Company, and site of proposed structures of the Boston Terminal Company, on Fort Point Channel, in Boston.
Oct. 1. Wharf of Emeline L. Kenrick, on Chelsea Creek, at East Boston.

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Oct. 2. Merrimac River, at Rocks bridge. Proposed dumping of dredged material.

Oct. 8. Site of proposed wharf of E. P. Wadsworth, in Duxbury harbor.

Oct. 10. }
Oct. 11. } Province lands, in Provincetown.
Oct. 12. }

Oct. 14. Delano's wharves, in New Bedford harbor.

Nov. 6. Protective work on the Connecticut River, in Agawam.

Nov. 7. Protective works on the Connecticut River, in Hadley, and banks of said river in the towns of Hatfield and Hadley and city of Northampton.

Nov. 11. Charles River, at Brighton. Proposed dumping of dredged material.

Licenses granted during the Year.

Nos.

1862. Petition of the Lynn & Boston Railroad Company for license to dump snow and ice into Mystic River. Granted Dec. 3, 1895.

1863. Petition of the Union Freight Railroad Company for license to dump snow and ice into Charles River and Fort Point Channel. Granted Dec. 3, 1895.

1864. Petition of the West End Street Railway Company for license to build a pile wharf, lay a pipe and to dredge in Mystic River in the city of Boston. Granted Dec. 24, 1895.

1865. Petition of the city of Boston for license to dump snow and ice into tide waters. Granted Jan. 20, 1896.

1866. Petition of Orlando E. Lewis for license to fill solid in Crystal Bay in the town of Winthrop. Granted Jan. 20, 1896.

1867. Petition of the West End Street Railway Company for license to maintain a wooden box conduit and to construct a suction well in Chelsea Creek at East Boston. Granted Jan. 20, 1896.

1868. Petition of Orlando F. Belcher for license to fill solid on his beach and flats at Cottage Park and Bartlett Park in the town of Winthrop. Granted Jan. 23, 1896.

1869. Petition of the city of Beverly for license to lay and maintain a cast-iron sewer pipe in Beverly harbor in said city. Granted Jan. 23, 1896.

1870. Petition of George R. Bradford for license to build a sea wall, drive piles and fill solid in Gloucester harbor in the city of Gloucester. Granted Jan. 23, 1896.

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Nos.

1871. Petition of Jerome C. Borden for license to build bulkheads, drive piles and fill solid in Mount Hope Bay in the city of Fall River. Granted Jan. 23, 1896.

1872. Petition of John Killen for license to fill solid a portion of a dock in Nantucket harbor in the town of Nantucket. Granted Jan. 23, 1896.

1873. Petition of the town of Braintree for license to maintain certain filling in Little Pond in said town. Granted Feb. 5, 1896.

1874. Petition of Oliver C. Lumbert for license to build a wharf in Cotuit harbor in the town of Barnstable. Granted Feb. 5, 1896.

1875. Petition of Alexander C. Adams for license to build a wharf in Cotuit harbor in the town of Barnstable. Granted Feb. 5, 1896.

1876. Petition of John A. Morse for license to build a wharf in Cotuit harbor in the town of Barnstable. Granted Feb. 5, 1896.

1877. Petition of Winchester Smith for license to fill solid a portion of a dock on South River in the city of Salem. Granted Feb. 11, 1896.

1878. Petition of Edwin Baxter and others for license to build a dam across the outlet of Dinah's Pond in the town of Yarmouth. Granted Feb. 11, 1896.

1879. Petition of the Lynn Yacht Club for license to extend its wharf, on piles, and to maintain rafts in Lynn harbor in the city of Lynn. Granted Feb. 12, 1896.

1880. Petition of David B. Smith & Company for license to widen and extend their wharf, on piles, in Gloucester harbor in the city of Gloucester. Granted Feb. 12, 1896.

1881. Petition of Robert K. Lufkin for license to build a sea wall and fill solid in Gloucester harbor in the city of Gloucester. Granted Feb. 12, 1896.

1882. Petition of Robert Winsor for license to build a bridge in Red Brook harbor between "Inner" Island and "Rocky" Island at Cataumet in the town of Bourne. Granted Feb. 13, 1896.

1883. Petition of Charles R. Codman for license to build and maintain a pile wharf and float stage in Cotuit harbor in the town of Barnstable. Granted Feb. 20, 1896.

1884. Petition of Lucian Newhall for license to build a sea wall and fill solid in Swampscott Bay at Red Rock in the city of Lynn. Granted Feb. 20, 1896.

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Nos.

1885. Petition of Fanny R. Dowse for license to build a dike across the outlet connecting Phinney Bay and East Bay at Wianno in the town of Barnstable. Granted March 2, 1896.

1886. Petition of Josiah C. Bennett for license to build a bulkhead and fill solid in Lynn harbor in the city of Lynn. Granted March 3, 1896.

1887. Petition of the Plymouth Foundry Company for license to build a sea wall, fill solid and construct a building on Town Brook in the town of Plymouth. Granted March 3, 1896.

1888. Petition of Emma L. Wood for license to fill solid on her beach and flats in Boston harbor in the town of Winthrop. Granted March 16, 1896.

1889. Petition of the Boston & Maine Railroad for license to fill solid in tide water northerly of Beach street in the town of Manchester. Granted March 23, 1896.

1890. Petition of Rufus E. Snow and others for approval of plans for constructing an outlet from Sparrow's Pond in the town of Orleans, to Potanimicot River, as authorized by chapter 107 of the Acts of 1894. Granted March 23, 1896.

1891. Petition of the Boston & Maine Railroad for license to build a fender guard and dolphin in Charles River in the city of Cambridge. Granted March 25, 1896.

1892. Petition of the Boston & Nantasket Steamboat Company for license to build an addition to the wharf of the Quincy & Nantasket Steamboat Company, and to dredge in Hull Bay in the town of Hull. Granted March 25, 1896.

1893. Petition of the New York, New Haven & Hartford Railroad Company for license to build a retaining wall and fill solid in Hull harbor in the town of Hull. Granted April 6, 1896.

1894. Petition of the receivers of the Philadelphia & Reading Coal and Iron Company for license to drive piles in the dock adjoining the northerly side of their wharf on Acushnet River in the city of New Bedford, and to rebuild the easterly end of said wharf. Granted April 6, 1896.

1895. Petition of the Dartmouth Manufacturing Corporation for license to lay a 24-inch pipe and construct a stone and timber crib in New Bedford harbor in the city of New Bedford. Granted April 9, 1896.

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Nos.

1896. Petition of the Carver Green Company for license to excavate a trench and draw water from Cooper's Pond in the town of Carver. Granted April 16, 1896.

1897. Petition of the Bunker Hill Yacht Club for license to build and maintain a club house, on piles, and locate and maintain float stages on the south channel of Mystic River in the city of Boston. Granted April 16, 1896.

1898. Petition of the Fiske Wharf and Warehouse Company for license to widen Harris wharf, on piles, in Boston harbor in the city of Boston. Granted April 28, 1896.

1899. Petition of the Boston & Albany Railroad Company for license to repair its Pier No. 3, Grand Junction wharves, in Boston harbor at East Boston. Granted April 28, 1896.

1900. Petition of William E. Sherriffs and Julia W. Sherriffs for license to build a wharf in Hull harbor in the town of Hull. Granted April 28, 1896.

1901. Petition of John D. W. French, trustee, for license to build a pile wharf, fill solid and to dredge in Chelsea Creek in the city of Chelsea. Granted April 29, 1896.

1902. Petition of the Boston, Revere Beach & Lynn Railroad Company for license to fill solid a portion of its bridge in Boston harbor in the town of Winthrop. Granted May 7, 1896.

1903. Petition of Nathaniel E. Harlow for license to widen Robbins wharf in Plymouth harbor in the town of Plymouth. Granted May 8, 1896.

1904. Petition of William Minot and William A. Hayes, trustees, for license to build a pile wharf on Fort Point Channel in the city of Boston. Granted May 8, 1896.

1905. Petition of John Parkinson and W. E. C. Eustis, trustees, for license to extend their wharf, on piles, and to locate and maintain a float stage in Buzzards Bay in the town of Bourne. Granted May 8, 1896.

1906. Petition of Leonard Thompson for license to widen and extend his wharf, partly solid and partly on piles, and to dredge in Hingham harbor in the town of Hingham. Granted May 11, 1896.

1907. Petition of George T. Ryder and Desire B. Ryder for license to build and maintain a flume, lay a pipe and draw water from Stillwater Pond in the town of Chatham. Granted May 14, 1896.

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Nos.

1908. Petition of John C. Inches and George B. Inches for license to widen and extend Russia wharf, partly solid and partly on piles, on Fort Point Channel in the city of Boston. Granted May 14, 1896.

1909. Petition of the proprietors of Liverpool wharf for license to widen and extend Pearl Street wharf, partly solid and partly on piles, on Fort Point Channel in the city of Boston. Granted May 14, 1896.

1910. Petition of Jacob H. Hecht for license to build sea walls and bulkheads, drive piles and fill solid at his wharf on Fort Point Channel in the city of Boston. Granted May 19, 1896.

1911. Petition of Amelia Swanson and Augusta De Wolf for license to build a pile structure and fill solid in Boston harbor at East Boston. Granted May 20, 1896.

1912. Petition of Pope's Island Manufacturing Corporation for license to build a stone and timber bulkhead and to fill solid on Acushnet River in the city of New Bedford. Granted May 21, 1896.

1913. Petition of the Metropolitan Water Board for approval of plans for laying water pipes across Charles River at a point about 1,250 feet above Essex Street bridge, in the cities of Boston and Cambridge, as authorized by chapter 488 of the Acts of 1895. Granted May 25, 1896.

1914. Petition of the Metropolitan Water Board for approval of plans for laying water pipes across Charles River northwesterly of and near North Harvard Street bridge, in the cities of Boston and Cambridge, as authorized by chapter 488 of the Acts of 1895. Granted May 25, 1896.

1915. Petition of the Metropolitan Water Board for approval of plans for laying water pipes across Mystic River, near Middlesex Avenue bridge, in the cities of Medford and Somerville, as authorized by chapter 488 of the Acts of 1895. Granted May 25, 1896.

1916. Petition of the city of Springfield for license to build an outfall sewer on Connecticut River in said city. Granted May 25, 1896.

1917. Petition of George Parker for license to build pile wharves in Boston harbor at East Boston. Granted May 27, 1896.

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Nos.

1918. Petition of the town of Manchester for license to build and maintain a pile wharf and float stages in Manchester harbor in said town. Granted May 27, 1896.

1919. Petition of Putnam & Pope for license to widen and extend their wharf on Bass River in the city of Beverly. Granted May 27, 1896.

1920. Petition of Albert Brackett & Son for license to build a pile wharf on Charles River in the city of Boston. Granted May 28, 1896.

1921. Petition of the Board of County Commissioners of Bristol County for approval of plans for building a bridge across Acushnet River between New Bedford and Fairhaven, as authorized by chapter 368 of the Acts of 1893, and chapters 239 and 530 of the Acts of 1894. Granted May 28, 1896.

1922. Petition of Bradford D. Davol for license to build and maintain a pile wharf and float stage on Taunton Great River in the town of Dighton. Granted June 8, 1896.

1923. Petition of Slade Gorton & Co. for license to widen their wharf, on piles, in Gloucester harbor in the city of Gloucester. Granted June 8, 1896.

1924. Petition of the Boston & Lowell Railroad Corporation for license to build two dolphins on Charles River in the city of Cambridge. Granted June 8, 1896.

1925. Petition of Anna W. Barker for license to drive piles in Half Way Pond in the town of Plymouth, and draw water from said pond. Granted June 8, 1896.

1926. Petition of the Vineyard Grove Company for approval of plans for erecting and maintaining structures in Vineyard Sound in the town of Cottage City, as authorized by chapter 299 of the Acts of 1896. Granted June 8, 1896.

1927. Petition of the Hingham Street Railway Company for license to construct wells, lay a pipe and drive piles in Hingham Bay in the town of Hingham. Granted June 8, 1896.

1928. Petition of Amos S. Brown, trustee, and Mary G. Lamper for license to build a sea wall and fill solid in Lynn harbor between said wall and Lamper's Mill Pond in the city of Lynn. Granted June 8, 1896.

1929. Petition of Susan W. Longworth for license to build and maintain a pile wharf in Beverly harbor in the city of Beverly. Granted June 8, 1896.

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Nos.

1930. Petition of H. G. Jordan & Co. for license to build a pile wharf on Fort Point Channel in the city of Boston. Granted June 8, 1896.

1931. Petition of Emma Alexanderson for license to build a pile wharf, erect buildings and fill solid on Weymouth Fore River in the town of Weymouth. Granted June 11, 1896.

1932. Petition of the Plymouth Cordage Company for license to widen and extend its wharf and construct dolphins in Plymouth harbor in the town of Plymouth. Granted June 29, 1896.

1933. Petition of the New England Railroad Company and Old Colony Railroad Company for license to fill solid in South Bay in the city of Boston. Granted June 29, 1896.

1934. Petition of the town of Nantucket for license to fill solid between Straight wharf and Old South wharf in Nantucket harbor in said town. Granted July 7, 1896.

1935. Petition of the city of New Bedford for approval of plans for structures in Great Quittacus Pond and Little Quittacus Pond in the towns of Rochester and Lakeville, as authorized by chapter 345 of the Acts of 1894. Granted July 7, 1896.

1936. Petition of Edward S. Hamlin & Co. for license to fill solid and build a pile wharf on Neponset River in the city of Boston. Granted July 7, 1896.

1937. Petition of the West End Street Railway Company for license to fill solid, build a pile wharf, lay a pipe and dredge a channel in Dorchester Bay in the city of Boston. Granted July 7, 1896.

1938. Petition of George W. Lane for license to build a pile and timber bulkhead, drive piles, and fill solid at his wharf on South River in the city of Salem. Granted July 9, 1896.

1939. Petition of M. Louise Marshall for license to build and maintain a wharf and float stage in Quisset harbor in the town of Falmouth. Granted July 14, 1896.

1940. Petition of the Boston and Lowell Railroad Corporation for license to build a sea wall and fill solid on Miller's River in the city of Cambridge. Granted July 14, 1896.

1941. Petition of C. A. Sawyer for license to build and maintain a pile and timber wharf and boat-house in Lake Whalom in the town of Leominster. Granted July 14, 1896.

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Nos.

1942. Petition of Andrew J. Litchfield for license to build and maintain a pile and timber wharf in Lake Whalom in the town of Lunenburg. Granted July 14, 1896.

1943. Petition of Horace W. Woodberry for license to extend his boat-house, on piles, in Beverly harbor in the city of Beverly. Granted July 14, 1896.

1944. Petition of the Board of County Commissioners of Bristol County for approval of plans for building a bridge over Taunton Great River, between Dighton and Berkley, as authorized and required by chapter 341 of the Acts of 1896. Granted July 16, 1896.

1945. Petition of the city of Cambridge for license to deposit ballast below and outside of the sea wall on Charles River at the "Front" in said city. Granted July 23, 1896.

1946. Petition of the city of New Bedford for approval of plans for the extension of Howland Street, and for building a sewer and filling solid in Acushnet River in the city of New Bedford, as authorized by chapter 176 of the Acts of 1883. Granted July 23, 1896.

1947. Petition of the Trustees of the Hingham and Quincy bridges for license to widen the present highway bridge on Weymouth Back River in the towns of Weymouth and Hingham. Granted July 23, 1896.

1948. Petition of the Feoffees of the grammar school in Ipswich for license to widen their wharf on Ipswich River in the town of Ipswich. Granted July 23, 1896.

1949. Petition of the New York, New Haven & Hartford Railroad Company for license to widen a portion of its bridge over Fort Point Channel at Broadway bridge in the city of Boston. Granted July 23, 1896.

1950. Petition of George H. Cavanagh and John Cavanagh for license to build a pile wharf in South Bay in the city of Boston. Granted July 28, 1896.

1951. Petition of Leroy S. Johnson for license to fill solid a portion of his pile wharf in South Bay in the city of Boston. Granted July 28, 1896.

1952. Petition of William H. Goodwin for license to build and maintain a timber pier and float stage in Salem harbor in the town of Marblehead. Granted July 31, 1896.

1953. Petition of Libbie P. Bullivant for license to build a wharf in Marion harbor in the town of Marion. Granted Aug. 18, 1896.

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Nos.

1954. Petition of Elmer E. Tilden for license to build and maintain a pier, drop, float and runway in Hull Bay in the town of Hull. Granted Aug. 25, 1896.

1955. Petition of the Boston & Maine Railroad for license to build a culvert and to widen its road-bed on Bass River near Beverly station in the city of Beverly. Granted Sept. 4, 1896.

1956. Petition of the city of Springfield for license to build a dike on the easterly bank of the Connecticut River in said city. Granted Sept. 4, 1896.

1957. Petition of the Boston Transit Commission for approval of plans for building piers for a bridge over Charles River in the city of Boston, as authorized and required by chapter 548 of the Acts of 1894. Granted Sept. 8, 1896.

1958. Petition of the city of Lynn for approval of plans for abating nuisance on Little River in said city, as authorized by chapter 302 of the Acts of 1894. Granted Sept. 17, 1896.

1959. Petition of Harriet A. Porter for license to fill flats on Charles River adjoining Main Street in the city of Cambridge. Granted Sept. 28, 1896.

1960. Petition of the Garfield & Proctor Coal Company for license to drive piles, build a sea wall and fill solid on Acushnet River in the city of New Bedford. Granted Sept. 28, 1896.

1961. Petition of Henry A. Lambert and Sarah G. Lambert for license to build and maintain a float stage in Salem harbor at Juniper Point in the city of Salem. Granted Sept. 28, 1896.

1962. Petition of the Board of Metropolitan Sewerage Commissioners for approval of plans for laying a siphon across Charles River between Brighton and Watertown, as authorized by chapter 439 of the Acts of 1889. Granted Sept. 28, 1896.

1963. Petition of the New Bedford Yacht Club for license to drive piles for the support of a building in New Bedford harbor in the city of New Bedford. Granted Oct. 2, 1896.

1964. Petition of Emeline L. Kenrick for license to build a pile pier and dolphins on Chelsea Creek at East Boston. Granted Oct. 2, 1896.

1965. Petition of the New York, New Haven & Hartford Railroad Company for license to widen a portion of its

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Nos.

bridge over Fort Point Channel at Broadway bridge in the city of Boston. Granted Oct. 7, 1896.

1966. Petition of Edward P. Wadsworth for license to build and maintain a pile wharf and float stage in Duxbury Bay in the town of Duxbury. Granted Oct. 9, 1896.

1967. Petition of the North Shore Lumber Company for license to fill solid and build a pile wharf on Beverly Creek in the city of Beverly. Granted Oct. 19, 1896.

1968. Petition of Warren Delano for license to build a pile wharf and stone and timber cribs on Acushnet River in the town of Fairhaven. Granted Oct. 21, 1896.

1969. Petition of the city of Beverly for license to build a pile and timber structure in Beverly harbor at the easterly end of the outfall sewer opposite Andrews Court in said city. Granted Oct. 21, 1896.

1970. Petition of the city of Boston for license to drive piles in Essex Street bridge on Charles River in said city. Granted Oct. 21, 1896.

1971. Petition of the Thomson-Houston Electric Company for license to construct a pump sump and lay a pipe in Saugus River in the city of Lynn. Granted Oct. 28, 1896.

1972. Petition of the New Bedford Yacht Club for license to extend its wharf in New Bedford harbor in the city of New Bedford. Granted Oct. 28, 1896.

1973. Petition of Warren Delano, Jr., and Frederick A. Delano for license to build a sea wall, fill solid, drive piles and to dredge at "Old North Wharf" on Acushnet River in the town of Fairhaven. Granted Nov. 17, 1896.

1974. Petition of the Brookline Gas Light Company for approval of plans for laying a gas main and siphon across Fort Point Channel at Dover Street bridge in the city of Boston, as authorized by chapter 405 of the Acts of 1895. Granted Nov. 17, 1896.

1975. Petition of the Hingham Street Railway Company for license to lay a cable under the channel of Weymouth Back River in the town of Hingham. Granted Nov. 20, 1896.

1976. Petition of the Lowell, Lawrence & Haverhill Street Railway Company for license to lay and maintain cables in and under Merrimac River in the city of Haverhill and towns of Bradford and Groveland. Granted Nov. 20, 1896.

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Miscellaneous Permits.

The Board has granted during the year forty-two miscellaneous permits, in addition to the licenses for structures in tide water, great ponds and Connecticut River, previously mentioned. These permits were: for dredging; for the removal of material from certain beaches; for dumping material dredged from certain localities; for placing a mooring buoy and dolphin; for driving piles for temporary purposes; for using a portion of the Commonwealth's land at South Boston; and for authorizing the publication of notices by the New York, New Haven & Hartford Railroad Company, in the name of the Board, for closing Fort Point Channel to the passage of vessels through the bridge of said company for the purpose of making necessary repairs to said bridge.

Tide-water Assessments and Harbor Compensation Fund.

There was paid into the treasury of the Commonwealth during the year, under section 14 of chapter 19 of the Public Statutes, $5,983.05 in payment for tide water displaced by work done under licenses granted by the Board, and $1,200 in payment for gravel removed from Neponset River and Charles River under permits from the Board, making a total of $7,183.05 credited to the harbor compensation fund for Boston harbor.

The amount in the harbor compensation fund for Boston harbor on Nov. 30, 1896, was $231,120.21. The income from this fund on the same date was $5,704.65.

Receipts from Grants of Public Lands.

There was paid into the treasury of the Commonwealth during the year, under the provisions of section 16 of chapter 19 of the Public Statutes and chapter 318 of the Acts of 1888, for grants of rights and privileges in tide waters and great ponds under licenses from the Board, the sum of $34,187.25.

In addition to the payments above mentioned, $353.32 was paid for releases of Back Bay lands, $100 for rent of

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Hangman's Island, and $50.20 for gravel removed from Lynn harbor.

By chapter 313 of the Acts of 1864, all net receipts from sales of public lands were to be paid into a sinking fund established by this act.

By chapter 122 of the Acts of 1865, the Massachusetts war fund was established, section 3 of this act providing that a sinking fund be created, composed in part of receipts from public lands or flats not already appropriated for specific purposes.

By chapter 8 of the Resolves of 1872, the income of the war loan sinking fund is to be credited to the Troy & Greenfield Railroad sinking fund.

Payment for grants of tide-water lands of the Commonwealth was first required by chapter 284 of the Acts of 1874, and since the passage of that act the total amount received and paid into the treasury of the Commonwealth and credited to the Troy & Greenfield Railroad loan sinking fund is $408,820.95. The amount received during the year from rents of the Commonwealth's lands at South Boston, and paid into the Commonwealth's flats improvement fund, is $2,988.90, as already stated.

The income of the harbor compensation fund for Boston harbor is inadequate to the growing demands on it. With the expansion of commerce and the size of vessels this demand may be expected to increase. The building of this fund by the proceeds of assessments for tide water displaced was a natural sequence from the adoption of the policy of assessment. There is, however, another property right which might with propriety be made to contribute to swelling this fund, and that is the proceeds of the sale of the Commonwealth's land under tide waters. Hitherto the proceeds of such sales have been devoted to the war loan sinking fund and afterwards to the sinking fund of the Troy & Greenfield Railroad. The latter will be filled in September, 1897; and it is submitted that no more appropriate diversion of it could be made than toward the increase of that fund the income of which is forever devoted to the improvement of the harbor, the area of which is diminished by the sale of the tide lands. The income from

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the proceeds of the diminution of the tide-water areas will thus be used to deepen the approaches.

New Quarters.

The Board takes great pleasure in making due acknowledgment for its new and commodious quarters, Nos. 129-133 inclusive, in the State House Extension. We at last feel that now we can gather together in one set of connected rooms all the valuable maps, plans, books and papers in the custody of the Board and preserve them, arranged in a manner most appropriate for daily use, under conditions such as reduce to a minimum the danger from fire. The apartment next adjoining and originally designed to go with those appropriated to the use of the Board it is hoped, when the State House is completed, will be added, thus affording the Board the fullest accommodation for the prosecution of its work.

Salaries of the Commissioners.

Again, it is thought proper to invite the attention of the Legislature to the very inadequate salaries of the Commissioners. There is, comparatively speaking, not a large amount of clerical work connected with the functions of the Board. Keeping a full and correct record of the hearings, the findings of the Board, preparing the licenses to be issued, and giving daily information in answer to inquiries and maintaining correspondence, occupy the greater portion of the time of the secretary. The engineering work requires great care and study, and is continually adding most valuable data to the topographical records of the Commonwealth. The functions of the Board itself are largely judicial and are more frequently invoked in determining questions of public policy mingled with more or less law, and in so shaping the conclusions reached on the particular facts of the petitions presented as to bring them in harmony with declared policy.

The foregoing report is respectfully submitted by

WOODWARD EMERY,
JOHN I. BAKER,
CHARLES H. HOWLAND,
Commissioners.

December 1, 1896

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APPENDIX.

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APPENDIX.

[A.]

[See page 8 of this report, *ante*.]

CONTRACT.

ARTICLES OF AGREEMENT, MADE THIS TWENTY-SECOND DAY OF OCTOBER IN THE YEAR EIGHTEEN HUNDRED AND NINETY-SIX, BY AND BETWEEN THE COMMONWEALTH OF MASSACHUSETTS, ACTING BY THE BOARD OF HARBOR AND LAND COMMISSIONERS WITH THE APPROVAL OF THE GOVERNOR AND COUNCIL, AND THE NEW ENGLAND DREDGING COMPANY, A CORPORATION DULY ESTABLISHED UNDER THE LAWS OF SAID COMMONWEALTH, HEREINAFTER DESIGNATED AS THE CONTRACTOR.

The contractor hereby covenants and agrees with the Commonwealth to do and complete all the work necessary and proper to excavate by dredging a channel in South Boston flats, just east of Slate Ledge, all the work to be done and completed in the manner and in accordance with and subject to the terms and conditions set forth in the following specifications.

The word "engineer" when used herein shall mean the engineer of the Board of Harbor and Land Commissioners acting directly or through his properly authorized agents, such agents acting within the scope of the particular duties intrusted to them.

Specifications.

The contractor is to furnish all the plant, tools, appliances and labor necessary to do the work contracted for, as follows: —

The channel to be dredged is about 1,550 feet long. It begins at a point 100 feet north-easterly of the north-easterly bulkhead, inclosing the filled portion of the South Boston flats and about 250 feet north-westerly of the easterly corner of the bulkhead, and thence extends north-easterly to the three-fathom curve on the southerly side of the main channel of the harbor. It is to be 75 feet wide on the bottom and 18 feet deep at mean low water, and the banks at the sides and end are to be sloped up on an angle not steeper than 2 to 1, said slopes to be outside of the main por-

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tion of the channel, which is 75 feet wide. The exact location and a cross-section showing the shape of the channel to be excavated are shown on a plan on file in the office of the Board of Harbor and Land Commissioners, entitled "Plan showing channel to be dredged in South Boston flats. September, 1896. Scale, $\frac{1}{1000}$."

The amount of material between the present bottom and the plane of 18 feet below mean low water within the channel lines is as follows, to wit: —

	Cubic yards.
	39,200
In the side slopes, ...	12,300
Total, ...	51,500

The least present depth of water within the limits of the channel is about 4 feet at mean low water, and the average cut is about 9.1 feet.

The above-described channel is to be dredged so that it shall have, when the work is completed, a cross-section throughout as hereinbefore described, and no extra payment or allowance to be made for any excavation below the required depth, or outside of the required cross-section.

The material excavated may be dumped on the portion of the South Boston flats lying easterly of the filled portion of the flats, northerly of a line in extension of a line parallel with and 50 feet northerly of the sea wall on the northerly side of the reserved channel and south-westerly of a line in extension of a line 25 feet south-westerly of the north-westerly bulkhead at such places within said area and in such manner as may be prescribed from time to time by the engineer. Two or more piles to be driven and maintained by the contractor upon each of the northerly and southerly limits of the dumping area to mark them during the progress of the work, and to be removed by him upon the completion of the work, if required by the engineer. If the contractor prefers, the material may be dumped in deep water east of a line drawn straight between Egg Rock and Minot's Light, or such other disposition may be made of the material as shall be approved by said Board.

All ledges and bowlders which may be found, and which can be removed by dredging, to be removed as part of the contract, without extra payment or allowance; but if any ledges or bowlders are found which cannot be removed by dredging, the covering material to be dredged away and the ledges and bowlders left bare to the depth aforesaid; and the engineer to be the sole judge to

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determine whether any ledge or bowlder can be removed by dredging or not.

The work to be done in such a way as not to unreasonably interfere with the construction simultaneously of a pile wharf along the south-easterly side of the 75 feet channel from its inner end to a point 400 feet from the bulkhead, and two dolphins on the same line, one 550 feet and one 800 feet from the bulkhead.

The aforesaid plan, and the surveys and calculations based thereon, are believed to be correct; but the contractor must examine for himself, as no allowance will be made for any errors or inaccuracies which may be found therein.

In all questions which may arise concerning measurements, lines and grades, or of interference with the work of other contractors, the decision of the engineer to be final. All lines and grades will be given by the engineer, but all necessary aid and materials for giving or indicating them to be furnished by the contractor at his own expense, and the marks given shall be carefully preserved.

Convenient facilities for the inspection of the work to be furnished by the contractor whenever requested by the engineer. All instructions and directions of the engineer to be strictly observed and followed; and when the contractor is not present to receive them, they shall be received and obeyed by the superintendent or foreman who may have charge of the particular work in reference to which they are given.

All of the work to be done to the satisfaction of the engineer, and with such machinery and appliances, and by such methods, as shall be approved by him, and to the acceptance of said Board.

The work to be commenced as soon as practicable, and to be prosecuted vigorously in all suitable weather until completion, and to be fully completed on or before the first day of March, 1897.

Estimates to be made by the engineer of the amount of work done up to the end of each calendar month, and payment to be made thereon of 75 per centum of the proportional part of the contract price applicable to such work, as computed by the engineer; the remaining 25 per centum to be paid upon the final completion and acceptance of the whole work.

In all operations connected with the work the contractor shall comply with all laws or regulations affecting in any way the conduct of those engaged on the work or the methods of doing the work, and persons employed in the performance of manual labor under this contract shall not be required to work more than nine hours in each day, and said nine hours shall constitute a day's work; and in the employment of mechanics and laborers in the

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construction of the work herein contracted for preference shall be given by the contractor to citizens of the United States, in accordance with the requirements of chapter 494 of the Acts of 1896.

The contractor shall take all responsibility of the work and take all precautions for preventing injuries to persons and property in or about the work, and shall assume the defence of and indemnify and save harmless the Commonwealth, its officers and agents, from all actions at law and claims relating to labor or materials furnished for the work, or to inventions, patents, or patent rights used in doing the work, or to injuries to any person or corporation received or sustained by or from the contractor or his employees in doing the work, or in consequence of any improper materials, implements or labor used therein, or to any act, omission or neglect of the contractor or his employees therein.

If the work to be done under this contract shall be abandoned by the contractor, or if the engineer at any time shall be of opinion, and shall so certify in writing to said Board of Harbor and Land Commissioners, that the work, or any part thereof, is unnecessarily or unreasonably delayed, or that the contractor is violating any of the provisions of this contract, said Board may notify the contractor to discontinue the work, and the contractor shall thereupon discontinue said work, and the Commonwealth may, after the said notice, complete the work by contract or otherwise, and may pay the expense of the same so far as may be out of any moneys then due or to become due the contractor under this contract. In case such expense is less than the sum which would have been payable under this contract if the same had been completed by the contractor, the contractor shall be entitled to receive the difference, and in case the expense shall exceed said sum the contractor shall pay the amount of such excess to the Commonwealth.

And the Commonwealth of Massachusetts, in consideration of the performance and completion by the contractor of all of said work in the manner and in accordance with the terms and conditions aforesaid, hereby covenants and agrees to pay the contractor the sum of thirteen thousand nine hundred and forty-five (13,945) dollars in full therefor, at the times and in the manner and upon the terms and conditions hereinbefore set forth.

In witness whereof, on the day and year first above written, the Commonwealth of Massachusetts, by the Board of Harbor and Land Commissioners, has caused these presents to be signed and delivered in its name and behalf, and the seal of the Commonwealth to be hereto affixed, and has also caused these presents to be approved by the Governor and Council; and the said New

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England Dredging Company, by Charles H. Souther its president, thereto duly authorized, has caused these presents to be signed and delivered in its name and behalf and its corporate seal to be hereunto affixed.

THE COMMONWEALTH OF MASSACHUSETTS,

By WOODWARD EMERY, }
CHAS. H. HOWLAND, } *Harbor and Land Commissioners.*

NEW ENGLAND DREDGING COMPANY,

By CHARLES H. SOUTHER,
President.

[SEAL OF NEW ENGLAND DREDGING COMPANY.]

COMMONWEALTH OF MASSACHUSETTS.

Approved in Council. Oct. 29, 1896.

EDWARD F. HAMLIN,
Executive Clerk.

Witness the seal of the Commonwealth:

[SEAL OF THE COMMONWEALTH.]

WM. M. OLIN,
Secretary.

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[B.]

[See page 8 of this report, *ante*.]

CONTRACT.

ARTICLES OF AGREEMENT, MADE THIS NINETEENTH DAY OF OCTOBER IN THE YEAR EIGHTEEN HUNDRED AND NINETY-SIX, BY AND BETWEEN THE COMMONWEALTH OF MASSACHUSETTS, ACTING BY THE BOARD OF HARBOR AND LAND COMMISSIONERS WITH THE APPROVAL OF THE GOVERNOR AND COUNCIL, AND ALBERT A. HERSEY OF EAST BOSTON, IN THE COUNTY OF SUFFOLK, HEREINAFTER DESIGNATED AS THE CONTRACTOR.

The contractor hereby covenants and agrees with the Commonwealth to provide all the materials and to do and complete all the work necessary and proper to build an oak pile wharf and two dolphins on South Boston flats in Boston Harbor, all the work to be done and completed in the manner and in accordance with and subject to the terms and conditions set forth in the following specifications.

The word "engineer" when used herein shall mean the engineer of the Board of Harbor and Land Commissioners acting directly or through his properly authorized agents, such agents acting within the scope of the particular duties intrusted to them.

Specifications.

The contractor is to furnish all the plant, tools, appliances, labor and materials necessary to build the wharf and dolphins and put them in condition for use, as follows: —

The wharf is to be located on the South Boston flats, near the north-easterly corner of the filled flats, and is to extend from the filled flats north-easterly toward the main channel of the harbor. It is to be 400 feet long, the inner 350 feet to be 30 feet wide, and the remaining 50 feet to be 50 feet wide. It is to be built of oak piles and braces and hard pine timber, and is to have a bulkhead or breakwater of spruce timber and plank running throughout its length and secured to the piles of the wharf.

Two dolphins, of four oak piles each, to be built in line with the north-westerly side of the wharf, one 150 feet and one 400 feet north-easterly from the northerly corner of the wharf.

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A plan on file in the office of the Board of Harbor and Land Commissioners, marked, "Plan of proposed wharf on South Boston flats, September, 1896," signed by Frank W. Hodgdon, engineer, shows the location, size and method of construction of the wharf, and is referred to and made a part of these specifications and is to be followed in all details not otherwise mentioned.

Piles and Pile-work.

All piles are to be new oak piles, sound and straight, at least 14 inches in diameter at a point 5 feet from the butt, and not less than 8 inches in diameter at the small end, including the bark in both cases, and are to be of proper lengths for driving, cutting off and capping at the proper grade. The main piles to be not less than 40 nor more than 45 feet in length. All piles must be free from defects of every kind (no knotty, rotten or worm-eaten, split, peeled or partly peeled or loose-bark piles will be accepted), and must be carefully and thoroughly driven to the satisfaction of the engineer. Any pile which may be driven in a wrong position, or which may not be long enough for capping after being driven, or which may be split in driving, shall be drawn up and another substituted.

All spur-shores are to be fitted in a workmanlike manner and bolted to the piles with 1¼-inch screw bolts. The fender piles to be bolted to the main piles with 1¼-inch screw-bolts with countersunk heads.

Belay posts to be large-sized piles with well-shaped butts, and driven in the location shown on the plan, and shaped, fitted and secured in the manner shown thereon.

Each bent of piles in the narrow section of the wharf, and each row of piles extending back from the three outer faces of the wide portion of the wharf, are to be braced with rough oak braces as shown on the plan. The girders and braces are to be hewn or sawed on one side and are to be large enough to square at least 4 inches by 5 inches at the small end; all to be fastened to the piles by one 1-inch screw-bolt in each bearing.

Dolphins.

The dolphins to consist of one main pile and three spur-shores each. Each spur-shore to be bolted to the main pile by one 1¼-inch screw-bolt. The piles in each dolphin to be further bound together by 3½ fathoms of 1-inch iron chain placed and secured in a manner to be approved by the engineer.

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Floor.

The main piles are to be capped with 6-inch by 10-inch double girder caps, which are to extend in one length entirely across the wharf throughout the narrow portion, and are to be bolted to the piles with two 1-inch screw-bolts in each pile, with two additional bolts at each butt joint. The floor to consist of stringers spaced two feet on centres, each stringer to extend over at least two bents and are to break joints throughout. The stringers next to fender caps and one other throughout the length of the wharf to be 10 inches by 12 inches, all others to be 6 inches by 12 inches. They are to be secured to caps by ¾-inch spike-bolts 18 inches long, one bolt in each end and one in each other bearing. This to be covered by 3-inch hard pine plank, laid heart side up, well spiked to the stringers with 7-inch steel wire nails, two nails in each bearing. Plank to be laid with ¼-inch open joints. Along the back side of the wharf and wherever there is no fender cap a strip of plank 3 inches by 8 inches will be spiked on top of the flooring plank in place of a fender cap, and the flooring plank to be cut flush with its outer edge. The fender piles to be capped with a solid 12-inch by 12-inch hard pine cap with scarfed joints, each scarf bolted with four ¾-inch screw-bolts. Ten ring-bolts as shown on plan, or such as may be approved by the engineer, to be placed in the wharf, thoroughly secured in a manner satisfactory to the engineer.

The two outer corners of the wharf to be constructed as shown by the detailed plan. The four middle fender piles in each corner to extend four feet above the floor of the wharf, to be rounded and finished as directed by the engineer. An iron strap 6 inches by ½ inch to be securely bolted around the two outer corners on a level with the fender cap. The wharf to be connected with and attached to the bulkhead enclosing the filled flats, in a manner to be approved by the engineer.

Bulkhead or Breakwater.

A bulkhead or breakwater to be built as shown on said plan, extending the whole length of the wharf. To consist of two spruce stringers, each 8 inches by 10 inches, bolted to the main piles of the wharf, one just under the girder caps, the under side of the other to be one foot above mean low water. The stringers to break-joint with each other, the joints to come between the piles and to be spliced by bolting a piece of the same size, not less than 3 feet long, on the back side of the stringer with four

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¾-inch screw-bolts. Upon this to be spiked 3-inch spruce plank not less than 22 feet long, extending from the under side of the floor of the wharf into the bottom of the harbor. Spikes to be large steel wire spikes, 7 inches long. There are to be two spikes in each bearing. The planks to be further secured by two strips of plank 3 inches by 6 inches, extending throughout the length of the bulkhead and bolted through to the two stringers by ¾-inch screw-bolts, one every six feet, with additional bolts at the joints when necessary.

Quality of Timber.

All timber used to be sound, straight-grained, of full size, rectangular in section, and of even thickness. All hard pine to be of quality known as "Prime." Spruce shall be sound, sawed square and free from large knots. The Commonwealth will furnish and deliver to the contractor, at its office building on the South Boston flats, one barrel of "Carbolineum Avenarius," a wood preservative. The contractor to furnish the necessary tools and labor to apply the preservative to such portion of the lumber used in the construction of the wharf, and in such manner as the engineer may direct. The lumber to which it is applied must be as dry as possible, and, if required by the engineer, must be stacked under cover for at least one week immediately before the preservative is applied.

Bolts.

All bolts to be best double refined wrought iron, and all screw-bolts to have nuts and washers of such sizes as shall be approved by the engineer.

General Clauses.

The work shall be done so as not to unreasonably interfere with the work of dredging the berth for vessels alongside the northwesterly side of the wharf and the channel leading from it to the main channel.

Upon the completion of the work, the contractor to remove from the premises all materials and refuse left from the construction, and to leave the premises in a condition satisfactory to the engineer.

The drawings and specifications are intended to be explanatory of each other; but should any discrepancy appear, or any misunderstanding arise as to the import of anything contained in either, the explanation and determination of the engineer shall be considered final and binding on the contractor. Any errors or omissions in drawings or specifications may be corrected by the engineer, such correction to govern all work only from the time that the engineer gives due notice thereof.

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In all questions which may arise concerning measurements, lines and grades, or of interference with other work or contractors, the decision of the engineer to be final. All lines and grades will be given by the engineer, but all necessary aid and materials for giving or indicating them to be furnished by the contractor at his own expense, and the marks given shall be carefully preserved.

Any materials condemned or rejected by the engineer may be branded or otherwise marked, and shall, on demand, be at once removed from the work.

Any unfaithful or imperfect work which may be discovered before the final acceptance of the work shall be corrected immediately, and any unsatisfactory materials delivered shall be rejected on the requirement of the engineer, notwithstanding that they may have been overlooked in previous inspection. The inspection of the work shall not relieve the contractor of any of his obligations to perform good work as herein prescribed; and all work of whatever kind which, during its progress and before it is finally accepted, may become damaged from any cause, shall be removed and replaced by good and satisfactory work.

Convenient facilities for the inspection of the work shall be furnished by the contractor whenever requested by the engineer. All instructions and directions of the engineer to be strictly observed and followed, and when the contractor is not present to receive them, they shall be received and obeyed by the superintendent or foreman who may have charge of the particular work in reference to which they are given.

All of the work to be done to the satisfaction of the engineer, and with such machinery and appliances, and by such methods, as shall be approved by him, and to the acceptance of said Board.

The work to be commenced as soon as practicable and to be prosecuted vigorously in all suitable weather until completion, and to be fully completed on or before the first day of March, 1897.

In all operations connected with the work the contractor shall comply with all laws or regulations affecting in any way the conduct of those engaged on the work, or the methods of doing the work, and persons employed in the performance of manual labor under this contract shall not be required to work more than nine hours in each day, and said nine hours shall constitute a day's work, and in the employment of mechanics and laborers in the construction of the work herein contracted for preference shall be given by the contractor to citizens of the United States, in accordance with the requirements of chapter 494 of the Acts of 1896.

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The contractor shall take all responsibility of the work and take all precautions for preventing injuries to persons and property in or about the work, and shall assume the defence of and indemnify and save harmless the Commonwealth, its officers and agents, from all actions at law and claims relating to labor or materials furnished for the work, or to inventions, patents, or patent rights used in doing the work, or to injuries to any person or corporation received or sustained by or from the contractor or his employees in doing the work, or in consequence of any improper materials, implements or labor used therein, or to any act, omission or neglect of the contractor or his employees therein.

If the work to be done under this contract shall be abandoned by the contractor, or if the engineer at any time shall be of opinion, and shall so certify in writing to said Board of Harbor and Land Commissioners, that the work or any part thereof is unnecessarily or unreasonably delayed, or that the contractor is violating any of the provisions of this contract, said Board may notify the contractor to discontinue the work and the contractor shall thereupon discontinue said work, and the Commonwealth may, after the said notice, complete the work by contract or otherwise, and may pay the expense of the same so far as may be out of any moneys then due or to become due the contractor under this contract. In case such expense is less than the sum which would have been payable under this contract if the same had been completed by the contractor, the contractor shall be entitled to receive the difference; and in case the expense shall exceed said sum, the contractor shall pay the amount of such excess to the Commonwealth.

Estimates to be made by the engineer at the end of each calendar month of the value of the work completed in place, and payment to be made thereon of 75 per centum of the value of said work, as computed by the engineer, the remaining 25 per centum to be paid upon the final completion and acceptance of the whole work.

And the Commonwealth of Massachusetts, in consideration of the performance and completion by the contractor of all of said work in the manner and in accordance with the terms and conditions aforesaid, hereby covenants and agrees to pay the contractor the sum of seven thousand four hundred and thirty-eight (7,438) dollars in full therefor, at the times and in the manner and upon the terms and conditions hereinbefore set forth.

In witness whereof, on the day and year first above written, the Commonwealth of Massachusetts, by the Board of Harbor and Land Commissioners, has caused these presents to be signed and delivered in its name and behalf, and the seal of the Common-

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wealth to be hereto affixed, and has also caused these presents to be approved by the Governor and Council; and the said Albert A. Hersey has hereunto set his hand and seal.

ALBERT A. HERSEY, [SEAL.]

THE COMMONWEALTH OF MASSACHUSETTS.

By WOODWARD EMERY, CHAS. H. HOWLAND, } *Harbor and Land Commissioners.*

COMMONWEALTH OF MASSACHUSETTS.

In Council, Oct. 22, 1896.

EDWARD F. HAMLIN,
Executive Clerk.

Witness the seal:

[SEAL OF THE COMMONWEALTH.]

WM. M. OLIN,
Secretary of the Commonwealth.

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[C.]

[See page 12 of this report, *ante*.]

CONTRACT.

ARTICLES OF AGREEMENT, MADE THIS ELEVENTH DAY OF JUNE, IN THE YEAR EIGHTEEN HUNDRED AND NINETY-SIX, BY AND BETWEEN THE COMMONWEALTH OF MASSACHUSETTS, ACTING BY THE BOARD OF HARBOR AND LAND COMMISSIONERS WITH THE APPROVAL OF THE GOVERNOR AND COUNCIL, AND THE NEW ENGLAND DREDGING COMPANY, A CORPORATION DULY ESTABLISHED UNDER THE LAWS OF SAID COMMONWEALTH, HEREINAFTER DESIGNATED AS THE CONTRACTOR.

The contractor hereby covenants and agrees with the Commonwealth to do and complete all the work necessary and proper to deepen by dredging two areas in Boston Harbor opposite the Grand Junction wharves in East Boston, all the work to be done and completed in the manner and in accordance with and subject to the terms and conditions set forth in the following specifications.

The word "engineer" when used herein shall mean the engineer of the Board of Harbor and Land Commissioners acting directly or through his properly authorized agents, such agents acting within the scope of the particular duties intrusted to them.

Specifications.

The contractor is to furnish all the plant, tools, appliances and labor necessary to do the work contracted for, as follows: —

The areas to be dredged lie in front of the Grand Junction wharves in East Boston, and extend from a line 50 feet outside of and parallel with the harbor line to the main channel of the harbor. The first area lies between the two areas which were dredged by the Commonwealth in 1895, opposite the Cunard wharf and opposite Dock No. 6 of the Grand Junction wharves. The second area lies between the area dredged in 1895, opposite Dock No. 6 and a line parallel with and 150 feet easterly from the prolongation, south-westerly, of the south-easterly side line of Pier No. 7 of the Grand Junction wharves. The first area contains about 282,650 square feet, and the second about 450,100 square feet.

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The location and dimensions of both areas are more exactly shown on a plan on file in the office of the Board of Harbor and Land Commissioners, entitled "Plan of areas to be dredged off Grand Junction wharves, East Boston. May, 1896. Scale, $\frac{1}{100}$." Said plan is referred to and made a part of these specifications.

The amount of material between the present bottom and the plane of 27 feet below mean low water is as follows, to wit: —

	Cubic Yards.
On the first area,	32,000
On the second area,	95,000
Total,	127,000

The least present depth of water on the first area is about 21.3 feet at mean low water, and the average cut is about 3 feet; and on the second the least depth is about 9.4 feet and the average cut about $5\frac{1}{3}$ feet.

The above-described areas are to be dredged so that they shall have, when the work is completed, a depth throughout of not less than 27 feet below the plane of mean low water.

The banks at the edges of the above-described areas to be sloped off sufficiently to maintain the required depth over the whole of said areas, and no extra payment or allowance to be made for such sloping, nor for any excavation below the required depth.

The material excavated to be dumped in deep water east of a line drawn straight between Egg Rock and Minot's Light; or such other disposition may be made of the material as shall be approved by said Board.

All ledges and bowlders which may be found, and which can be removed by dredging, to be removed as part of the contract without extra payment or allowance; but if any ledges or bowlders are found which cannot be removed by dredging, the covering material to be dredged away and the ledges and bowlders left bare to the depth aforesaid; and the engineer to be the sole judge to determine whether any ledge or bowlder can be removed by dredging or not.

The aforesaid plan, and the surveys and calculations based thereon, are believed to be correct, but the contractor must examine for himself, as no allowance will be made for any errors or inaccuracies which may be found therein.

In all questions which may arise concerning measurements, lines and grades, the decision of the engineer to be final. All lines and grades will be given by the engineer, but all necessary aid and materials for giving or indicating them to be furnished by the contractor at his own expense, and the marks given shall be carefully preserved.

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Convenient facilities for the inspection of the work to be furnished by the contractor whenever requested by the engineer. All instructions and directions of the engineer to be strictly observed and followed, and when the contractor is not present to receive them, they shall be received and obeyed by the superintendent or foreman who may have charge of the particular work in reference to which they are given.

All of the work to be done to the satisfaction of the engineer, and with such machinery and appliances, and by such methods, as shall be approved by him, and to the acceptance of said Board.

The work to be commenced as soon as practicable, and to be prosecuted vigorously in all suitable weather until completion, and to be fully completed on or before the first day of December, 1896.

Estimates to be made by the engineer of the amount of work done up to the end of each calendar month, and payment to be made thereon of 75 per centum of the proportional part of the contract price applicable to such work, as computed by the engineer; the remaining 25 per centum to be paid upon the final completion and acceptance of the whole work.

In all operations connected with the work, the contractor shall comply with all laws or regulations affecting in any way the conduct of those engaged on the work, or the methods of doing the work, and persons employed in the performance of manual labor under this contract shall not be required to work more than nine hours in each day, and said nine hours shall constitute a day's work.

The contractor shall take all responsibility of the work and take all precautions for preventing injuries to persons and property in or about the work, and shall assume the defence of and indemnify and save harmless the Commonwealth, its officers and agents, from all actions at law and claims relating to labor or materials furnished for the work, or to inventions, patents, or patent rights used in doing the work, or to injuries to any person or corporation received or sustained by or from the contractor or his employees in doing the work, or in consequence of any improper materials, implements or labor used therein, or to any act, omission or neglect of the contractor or his employees therein.

If the work to be done under this contract shall be abandoned by the contractor, or if the engineer at any time shall be of opinion, and shall so certify in writing to said Board of Harbor and Land Commissioners, that the work or any part thereof is unnecessarily or unreasonably delayed, or that the contractor is violating any of the provisions of this contract, said Board may

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notify the contractor to discontinue the work and the contractor shall thereupon discontinue said work, and the Commonwealth may thereupon complete the work by contract or otherwise, and may pay the expense of the same so far as may be out of any moneys then due or to become due the contractor under this contract. In case such expense is less than the sum which would have been payable under this contract if the same had been completed by the contractor, the contractor shall be entitled to receive the difference; and in case the expense shall exceed said sum, the contractor shall pay the amount of such excess to the Commonwealth.

And the Commonwealth of Massachusetts, in consideration of the performance and completion by the contractor of all of said work in the manner and in accordance with the terms and conditions aforesaid, hereby covenants and agrees to pay the contractor the sum of forty-eight thousand two hundred and eighty (48,280) dollars in full therefor, at the times and in the manner and upon the terms and conditions hereinbefore set forth.

IN WITNESS WHEREOF, on the day and year first above written, the Commonwealth of Massachusetts, by the Board of Harbor and Land Commissioners, has caused these presents to be signed and delivered in its name and behalf, and the seal of the Commonwealth to be hereto affixed, and has also caused these presents to be approved by the Governor and Council; and the said New England Dredging Company, by Charles H. Souther, its president and treasurer, thereunto duly authorized, has caused these presents to be signed and delivered in its name and behalf, and its corporate seal to be hereunto affixed.

THE COMMONWEALTH OF MASSACHUSETTS,

By WOODWARD EMERY,
JOHN I. BAKER,
CHAS. H. HOWLAND,
Harbor and Land Commissioners.

NEW ENGLAND DREDGING COMPANY,

By CHARLES H. SOUTHER,
President and Treasurer.

[SEAL OF THE N. E. DREDGING CO.]

COMMONWEALTH OF MASSACHUSETTS.

In Council, June 23, 1896.

E. F. HAMLIN,
Executive Clerk.

[SEAL OF THE COMMONWEALTH.]

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[D.]

[See page 12 of this report, *ante*.]

CONTRACT.

ARTICLES OF AGREEMENT, MADE THIS EIGHTH DAY OF JULY, IN THE YEAR EIGHTEEN HUNDRED AND NINETY-SIX, BY AND BETWEEN THE COMMONWEALTH OF MASSACHUSETTS, ACTING BY THE BOARD OF HARBOR AND LAND COMMISSIONERS WITH THE APPROVAL OF THE GOVERNOR AND COUNCIL, AND THE EASTERN DREDGING COMPANY, A CORPORATION ESTABLISHED UNDER THE LAWS OF THE STATE OF MAINE, AT PORTLAND IN SAID STATE, HEREINAFTER DESIGNATED AS THE CONTRACTOR.

The contractor hereby covenants and agrees with the Commonwealth to do and complete all the work necessary and proper to deepen by dredging an area in Boston Harbor opposite the Mystic wharves in Charlestown, all the work to be done and completed in the manner and in accordance with and subject to the terms and conditions set forth in the following specifications.

The word "engineer" when used herein shall mean the engineer of the Board of Harbor and Land Commissioners acting directly or through his properly authorized agents, such agents acting within the scope of the particular duties intrusted to them.

Specifications.

The contractor is to furnish all the plant, tools, appliances and labor necessary to do the work contracted for, as follows: —

The area to be dredged lies in front of the Mystic wharves and docks below Chelsea bridge in Charlestown, and extends from a line 50 feet outside of and parallel with the harbor line to the main channel of the harbor, and contains about 1,041,000 square feet. The location and dimensions of the area are more exactly shown on a plan on file in the office of the Board of Harbor and Land Commissioners, entitled "Plan of area to be dredged off Mystic wharves, Charlestown. June, 1896. Scale, $\frac{1}{10000}$." Said plan is referred to and made a part of these specifications.

The amount of material between the present bottom and the plane of 27 feet below mean low water is as follows, to wit: about 218,000 cubic yards.

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The least present depth of water on the area is about 3 feet at mean low water, and the average cut is about 5.2 feet.

The above-described areas are to be dredged so that they shall have, when the work is completed, a depth throughout of not less than 27 feet below the plane of mean low water.

The banks at the edges of the above-described areas to be sloped off sufficiently to maintain the required depth over the whole of said areas, and no extra payment or allowance to be made for such sloping, nor for any excavation below the required depth.

The material excavated to be dumped in deep water east of a line drawn straight between Egg Rock and Minot's Light, or such other disposition may be made of the material as shall be approved by said Board.

All ledges and bowlders which may be found, and which can be removed by dredging, to be removed as part of the contract without extra payment or allowance; but if any ledges or bowlders are found which cannot be removed by dredging, the covering material to be dredged away and the ledges and bowlders left bare to the depth aforesaid; and the engineer to be the sole judge to determine whether any ledge or bowlder can be removed by dredging or not.

The aforesaid plan, and the surveys and calculations based thereon, are believed to be correct, but the contractor must examine for himself, as no allowance will be made for any errors or inaccuracies which may be found therein.

In all questions which may arise concerning measurements, lines and grades, the decision of the engineer to be final. All lines and grades will be given by the engineer, but all necessary aid and materials for giving or indicating them to be furnished by the contractor at his own expense, and the marks given shall be carefully preserved.

Convenient facilities for the inspection of the work to be furnished by the contractor whenever requested by the engineer. All instructions and directions of the engineer to be strictly observed and followed, and when the contractor is not present to receive them, they shall be received and obeyed by the superintendent or foreman who may have charge of the particular work in reference to which they are given.

All of the work to be done to the satisfaction of the engineer, and with such machinery and appliances, and by such methods, as shall be approved by him, and to the acceptance of said Board.

The work to be commenced as soon as practicable, and to be prosecuted vigorously in all suitable weather until completion, and to be fully completed on or before the first day of July, 1897.

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Estimates to be made by the engineer of the amount of work done up to the end of each calendar month, and payment to be made thereon of 75 per centum of the proportional part of the contract price applicable to such work, as computed by the engineer; the remaining 25 per centum to be paid upon the final completion and acceptance of the whole work.

In all operations connected with the work, the contractor shall comply with all laws or regulations affecting in any way the conduct of those engaged on the work, or the methods of doing the work, and persons employed in the performance of manual labor under this contract shall not be required to work more than nine hours in each day, and said nine hours shall constitute a day's work.

The contractor shall take all responsibility of the work and take all precautions for preventing injuries to persons and property in or about the work, and shall assume the defence of and indemnify and save harmless the Commonwealth, its officers and agents, from all actions at law and claims relating to labor or materials furnished for the work, or to inventions, patents, or patent rights used in doing the work, or to injuries to any person or corporation received or sustained by or from the contractor or his employees in doing the work, or in consequence of any improper materials, implements or labor used therein, or to any act, omission or neglect of the contractor or his employees therein.

If the work to be done under this contract shall be abandoned by the contractor, or if the engineer at any time shall be of opinion, and shall so certify in writing to said Board of Harbor and Land Commissioners, that the work or any part thereof is unnecessarily or unreasonably delayed, or that the contractor is violating any of the provisions of this contract, said Board may notify the contractor to discontinue the work and the contractor shall thereupon discontinue said work, and the Commonwealth may thereupon complete the work by contract or otherwise, and may pay the expense of the same so far as may be out of any moneys then due or to become due the contractor under this contract. In case such expense is less than the sum which would have been payable under this contract if the same had been completed by the contractor, the contractor shall be entitled to receive the difference; and in case the expense shall exceed said sum, the contractor shall pay the amount of such excess to the Commonwealth.

And the Commonwealth of Massachusetts, in consideration of the performance and completion by the contractor of all of said work in the manner and in accordance with the terms and condi-

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tions aforesaid, hereby covenants and agrees to pay the contractor the sum of eighty-nine thousand two hundred and twenty-five (89,225) dollars in full therefor, at the times and in the manner and upon the terms and conditions hereinbefore set forth.

In witness whereof, on the day and year first above written, the Commonwealth of Massachusetts, by the Board of Harbor and Land Commissioners, has caused these presents to be signed and delivered in its name and behalf, and the seal of the Commonwealth to be hereto affixed, and has also caused these presents to be approved by the Governor and Council; and the said Eastern Dredging Company, by George E. Runyan, its treasurer, thereunto duly authorized, has caused these presents to be signed and delivered in its name and behalf, and its corporate seal to be hereunto affixed.

EASTERN DREDGING COMPANY,

By George E. Runyan, *Treasurer.* [seal of the eastern dredging company.]

THE COMMONWEALTH OF MASSACHUSETTS.

By Woodward Emery, Chas. H. Howland, *Harbor and Land Commissioners.*

COMMONWEALTH OF MASSACHUSETTS.

In Council, July 9, 1896.

Edward F. Hamlin,
Executive Clerk.

Commonwealth of Massachusetts.

Office of the Secretary.

Witness the seal of the Commonwealth:

Wm. M. Olin,
Secretary.

[seal of the commonwealth.]

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[E.]

[See page 25 of this report, *ante*.]

WARNING.

All persons are hereby warned against pulling or destroying any vegetable growth of any kind within the Province Lands belonging to the Commonwealth.

Any violation of this warning will be deemed a trespass and treated accordingly.

WOODWARD EMERY,
JOHN I. BAKER,
CHAS. H. HOWLAND,
Harbor and Land Commissioners.

Boston, May 28, 1896.

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Commissioners' Report.

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